



Illustrated FLORA OF TAJIKISTAN and adjacent areas

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EDITORS: ARKADIUSZ NOWAK & MARCIN NOBIS

To all Tajiks who supported us during the expeditions

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Arkadiusz Nowak & Marcin Nobis



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Photographs of plants, plant communities and landscapes are by Arkadiusz Nowak and Marcin Nobis.

Pictures of Didymophysa fedtschenkoana and Lindelophia olgae are by Maciej Kozak; Epipactis helleborine by Ewelina Klichowska and Pedicularis uliginosa by Elena Baiandina.

Drawings of plants by Ewa Marczyk.



Recently, the Polish Academy of Sciences has been actively supporting the botanical research in Middle Asia, with the main focus on Tajikistan. I'm very glad that during this period, the effective and valuable studies on endemic species, taxonomy, vegetation diversity, ecology and conservation, were conducted by the Polish botanists with an excellent support of Tajik academicians and scholars. I'm particularly proud that after many years of political turbulences the Polish researchers support the development

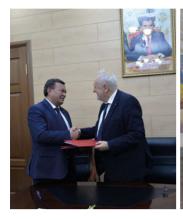
of plant and vegetation sciences in Tajikistan and substantially contribute to better knowledge on distribution patterns, endangerment, vegetation typology and within palaeobotanic studies. Particularly, the first compilation of steppe, scree, forest, field, riparian, pasture, forb and rock vegetation as well as taxonomic studies on grasses are of special value. Discovery of a number of new species and novel vegetation types and their comprehensive description is of the highest importance in the time of climate change and growing impact on Nature caused by human population. I'm fully aware that the plant diversity contributes to the intrinsic national identity of Tajik people and may serve as a bridge between different political, social and ethnic groups and the platform of cooperation with various approaches. That is why I found the book about the richness of Tajiks flora a milestone in protecting one of the most crucial treasure of this beautiful country and as substantial help with raising the awareness about the worth of plants among local people, students and researchers.

It was just a year ago I visited Tajikistan. I vividly recall how much I was impressed by the charming attitude of the people, hospitality and openness of our Tajik friends. I found that our meeting and the establishment of the official scientific relations has its first result in the presented book. Hopefully, this is only the first outcome of the common work of scientist from the Polish Academy of Sciences and the Academy of Sciences of the Republic of Tajikistan. I remember the extraordinary richness of the flora of Tajikistan and the beauty of the mountainous landscape of the Pamir-Alai Mts. I still recognize the outstanding history of the Tajik nation being sure, that Poles and Tajiks are born to cooperate within the scope of not only biology, but in general science. Surely, infrastructure and overall capacity are crucial for the research advancement, but the most important are people who want to share experience, knowledge and competences. I'm very happy that the Polish Academy of Sciences can support this cooperation without which such achievements would not be possible. I appreciate the initiative by the researchers of the PAS Botanical Garden and wish them many successful findings.

Professor Jerzy Duszyński

President of the Polish Academy of Sciences

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Prof. dr hab. Jerzy Duszyński, the President of the Polish Academy of Sciences and prof. Farhod Rahimi, the President of the Academy of Sciences of the Republic of Tajikistan, after the celebratory signature of the agreement on cooperation in Dushanbe, September 2019 (on the left).

Prof. dr hab. Szczepan Biliński, Vice-Rector of the Jagiellonian University and prof. Nuriddin Saidov, Rector of the Tajik National University, after signing the agreement on cooperation in Dushanbe, September 2010 (in the middle).

Dr Arkadiusz Nowak and dr Grzegorz Kusza (University of Opole) with prof. Odinaev Saidmuhammad Odinaevich (Rector of the Tajik National University) and Prof. A. Kadyrov (Head of the Department of Zoology) after signing the cooperation agreement in Dushanbe, October 2006 (on the right).

During last fifteen years different institutions supported our research program aimed at investigating plant diversity of Middle Asia. We want to thank all our supervisors and heads of our departments for their substantial support. Particularly, we want to express our gratitude to prof. Jerzy Duszyński (President of the Polish Academy of Sciences), prof. Szczepan Biliński (Vice Rector of the Jagiellonian University), prof. Adam Zając (Director of the Institute of Botany, Jagiellonian University), prof. Jerzy Lis (Head of the Department of Biosystematics of the University of Opole), prof. Czesława Rosik-Dulewska (Head of the Department of Land Protection of the Opole University) and dr Paweł Kojs (Director of PAS Botanical Garden – Center for Biodiversity Conservation in Powsin) for signing foundation documents of Polish-Tajik scientific cooperation that enable our research.

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FOREWORD

Middle Asia, including Tajikistan and its adjacent territories, is home to one of the world's richest flora. Only Tajikistan harbours ca. 4,300 vascular plant species. Our book is focused on the most common and showy plants, including ca. 700 endemics. Using our 15-year research experience in Tajikistan and adjacent countries, we also want to unpack various aspects of the magnificent flora of this mountainous region and present the Tajik flora with addition of ca. 250 species that we spotted in Kyrgyzstan and Uzbekistan (Western & Central Tian-Shan, Western Pamir-Alai). Our photographic guide includes vivid photographs of 1,864 species, as well as their distribution maps, systematic position, biological and ecological features. This edition of the illustrated flora of Tajikistan is substantially enlarged compared to previous ones (Nobis, Nowak, et al., 2011; Nowak et al., 2008; Nowak, Nobis, et al., 2011), updated with new maps and current taxonomy. As the flora of Tajikistan still remains underinvestigated, it is hardly possible to find photographs of the presented species in similar publications or on websites. The users of this book should be aware, that it covers only less than 50% of the total flora of Tajikistan and Middle Asian Mountains, and many of rare and inconspicous plants are not included here, although they can be found in this extraoriginal area. However, most of the more conspicous, common or useful plants can be idenified by using presented photographs, short descriptions and other information on vertical and horizontal distribution of particular species. This book can also be a useful tool for practical courses, excursions and field works, lectures and research. It is assigned for biologists, botanists, students, plant lovers, tourists visiting Middle Asia, and all other amateurs wanting to broaden their knowledge on the extraordinary and beautiful flora of this region.

Similarly as the other 'Field Guides' or 'Floras' published recently for other countries or their regions (e.g. Breckle & Rafiqpoor, 2010; Eisenman et al., 2013; Grey-Wilson & Cribb, 2011; Holubec & Horák, 2018; Jongbloed et al., 2003; Lazkov, 2015; Nobis, Nowak, et al., 2011; Nowak et al., 2008; Nowak, Nobis, et al., 2011; Stepantsova, 2013) this book can also be the starting point for a future database of the flora, which should be amended and enlarged in time and which could be excellent addition to further studies of the flora of both, Tajikistan and Mountains of Central Asia.

Determination of presented vascular plants has been carried according to the Flora of Tajik SSR (1957-1991), Flora of SSSR (1934–1964), Opredelitel rastenii Srednei Azii (1968–1993), Flora Iranica (1963–2010), Flora of Pakistan (1970-1998), Flora of Pakistan (http://www.tropicos.org/Project/Pakistan) and Flora of China (http://www.efloras.org/). The species nomenclature follows mainly The Plant List (http://www. theplantlist.org/) with the exception of the species from the Caryophyllaceae family, which are named after Lazkov (2006). Despite accepting The Plant List as a general concept and order in the book, we also include several recent amendments, taxonomic reviews (e.g. Kaplan, 2008; Mikhailova & Sochivko, 2011; Nobis et al., 2020; Nobis, Gudkova, et al., 2019; Sukhorukov et al., 2019; Tojibaev et al., 2018; Tzvelev, 1976), and available databases such as International Plant Names Index (https://www.ipni.org/) or Flora of China (http://www.efloras.org/). In the description of the species distribution, the geobotanical division proposed by Gontscharov (1937) was used. The chorological data were taken from bibliographic sources (Chukavina, 1984; Kinzikaeva, 1988; Kochkareva, 1986; Nobis et al., 2010; Nobis, Kowalczyk, et al., 2011; Nobis, 2013; Nobis, Ebel, et al., 2014; Nobis et al., 2015; Nobis, Nowak, et al., 2016; Nobis et al., 2017; Nobis, Klichowska, et al., 2019; Nobis & Nowak, 2008, 2011a, 2011b; Nowak & Nobis, 2010; Ovchinnikov, 1957, 1963, 1968, 1975, 1978, 1981; Rasulova, 1991), our own fieldworks (2006–2019) and herbarium records from plants preserved at AA, BISH, KHOR, KRA, LE, MW, OPUN, TAD, TASH (herbarium codes after Thires 2020).

We believe, that this *Illustated flora of Tajikistan and adjacent areas* will inspire many readers to learn more on vascular plant flora, nature and contribute to their conservation and extending the knowledge on this unique biodiversity of Middle Asian Mountains, known also as the World biodiversity hotspot.

Editors

INTRODUCTION1

Tajikistan is a mountainous, landlocked country with an extremely diverse climate, landscape and habitat conditions. Located between the continental Asian deserts in the west and south, and the great mountain ranges of Tian-Shan, Kunlun, Hindu-Kush and Karakorum in the north, east and south-east, having all vertical belts from hot to permafrost deserts it offers an outstanding range of biotopes for plants and vegetation. With one of the largest altitudinal amplitude in the world, extreme precipitation and temperature fluctuations, considerable glacier cover and diverse geology, the country promotes a great number of plant species and their communities. This has resulted in speciation of many altitudinal and ecological vicariants that occur in many cases in single, isolated valley or mountain ridge (e.g. Scutellaria or Nepeta genera). It is also important that Pamir-Alai is located within the borderland between two important geographic regions: the Central Asian (with considerable boreal and continental influences) and the Western Asian subregions (with stronger similarities to Mediterranean climate). This division is reflected to some extent by the phytogeographical division of the Irano-Turanian Province that is divided according to Grubov (2010) and Takhtajan (1986) into the Western Asian Subregion (with the Turkestan Province encompassing western and central Tajikistan) and the Central Asian Subregion (with the Tibetan Province encompassing eastern Pamir-Alai) (Figure 1). Additionally, it is worth noting that Pamir-Alai in the territory of Tajikistan is straddled across three important climatic regions: the Central Asian in the east and the Irano-Turanian in the west, with some influences of Indian and Saharo-Sindian from the south (Djamali et al., 2012).

This extraordinary complexity of climatic influences, phytogeographical divisions and diverse land geomorphology affect the floristic composition and richness of plant species of Tajikistan and its adjacent areas. Despite that the territory of Tajikistan is still far from being sufficiently investigated one can

¹ elaborated on the basis of Nowak et al., 2020. The Pamir-Alai Mountains (Middle Asia: Tajikistan). In: J. Naroozi (ed.), Plant Biogeography and Vegetation of High Mountains of Central and South-West Asia. Plant and Vegetation 17. Springer Nature. https://doi.org/10.1007/978-3-030-45212-4_1

assess that the vascular flora of Tajikistan consists of ca. 4,300 species assigned to 116 families, of which the richest are: Asteraceae, Fabaceae, Poaceae, Brassicaceae and Apiaceae. A high species richness has been noted for some of the 994 known genera, e.g. Astragalus (276 species), Cousinia (121), Allium (100), Taraxacum (60) and Oxytropis (58). The number of vascular plants of the region is still not final as recently some new species from Tajikistan have been published (e.g. Nobis et al., 2013; Nobis, Klichowska, et al., 2016; Nobis, Nobis, et al., 2014; Nobis & Nowak, 2011b). They belong to feathergrasses (e.g. Stipa ×brevicallosa, S. ×fallax, S. ×tadzhikistanica, S. zeravshanica), garlics (e.g. Allium intradarvazicum, A. khozratense, A. oreotadzhikorum, A. vallivanchense) and sainfoins (e.g. Onobrychis dushanbensis). There is also a number of alien species that were found in this country very recently. They include Amorpha fruticosa, Acalypha australis and Middle Asian, native plants known from neighbouring areas such as Nanorrhinum ramosissimum, Gypsophila floribunda and Zygophyllum miniatum. The degree of endemism in the flora of this area is a measure of its uniqueness and therefore should be used in the assessment for floral diversity conservation. Approximately 30% of vascular plants species known from Pamir-Alai are generally accepted endemics. About 1,400 plants meet the criteria for being a national endemic of Tajikistan, and a further 300 may be regarded as subendemics that occupy also the adjacent areas but not outside the borderland (e.g. mountain ranges or valleys). Many of these species have very limited areas of occupancy (e.g. Anemone zeravshanica, Sergia regelii and Scutellaria juzepczukii).

Because of its floristic richness, Tajikistan as a core area of the Mountains of Central Asia is recognised by Conservation International as a hotspot of biodiversity and one of the eleven most important focal points of future plant diversity studies and conservation (Giam et al., 2010; Mittermeier et al., 2011). Simultaneously, the country is regarded as the country most sensitive in the world to climate change and biodiversity loss, but still only twelve species from this country are listed as globally endangered (e.g. Darvaz dogwood *Sviida darvasica* and wild apple *Malus sieversii*). Additionally, Middle Asian mountainous temperate forests and steppes are regarded as a vulnerable ecoregion of the world (Olson & Dinerstein, 1998).

Recent analysis of the degree of the endangerment of Tajik's flora shows considerable threats to its

richness (Nowak et al., 2020). The study reveals that from 4,269 native species occurring in Tajikistan, 1,627 taxa (38.11%) are threatened and 23 extinct (0.54%).

GEOLOGY AND SOILS

The mountain systems in Tajikistan, mainly Pamir-Alai (Figure 2) were upheaved during the Cenozoic Era and are part of the long orogenic belt of Asia along the western section of the Himalayas, Karakorum and Hindukush line. The sedimentary deposits of ca. 20–25 km thickness have been shifted northwards by ca. 300 km. This massive crustal displacement is surely of continental collision origin. Still, the Indian subcontinent brings on the 20 mm northward slide of the Pamir Plateau over the Alai fault per year (Lohr, 2001).

The Pamir is characterised by a thick continental crust of about 70 km (Holt & Wallace, 1990). Geophysical observations show an oblique subduction zone submerging to the SSE beneath the Pamir (Billington et al., 1977). This subduction zone indicates a large Mesozoic thrust fault at the Trans-Alai range.

The geological profile of Pamir-Alai is extremely complex and sophisticated in interpretation. Between the Tajik and Tarim basins many faults, suture and subduction zones as well as sedimentation areas occur. As a result, the geological structure of the study area is very complex, with outcrops of rocks formed from the Precambrian to the present age. The rocks that are composing the territory of the country are very diverse in age, composition and structure. Only a few geological surveys have been published for Tajikistan so far (cf. Lohr, 2001; Nedzvedskiy, 1968). The northern part of the area (the Trans-Alai and Alai ranges) are built mainly by Carboniferous igneous and sedimentary rocks of an oceanic origin; these are dominantly mafic rocks and tholeiitic basalts covered by limestone, siltstone and sandstone (Budanov & Pashkov, 1988; Leven, 1981). In the south-western parts of the system – in the Darvaz Range - serpentine melange crops out accompanied by basalts, conglomerates and limestones (Pospelov, 1987). The montane and alpine zones of the Hissar Mts. are largely composed of extrusive rocks, mainly granite, granitoid and syenite. The ranges of the Peter

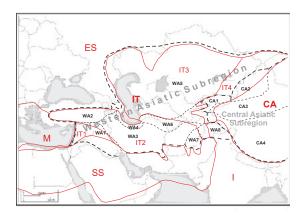


Figure 1. Phytogeographical division of the Central Asia according to Grubov (2010) and Takhtajan (1986) (black dashed lines); WA1 – Mesopotamian Province, WA2 – Central Anatolian Province, WA3 – Armeno-Iranian Province, WA4 – Hyrcanian Province, WA5 – Turanian Province, WA6 – Turkestanian Province, WA7 – Northern Baluchistanian Province, WA8 – Western Himalayan Province, CA1 – Central Tian-Shan Province, CA2 – Dzhungar-Tian-Shan Province, Ch3 – Mongolian Province, CA4 – Tibetan Province Bioclimatic regionalisation follows the Djamali et al. approach (2002; red lines). Explanations: SS – Saharo-Sindian Region, IT – Irano-Turanian Region (with four subregions (IT1-IT4), CA – Central Asian Region, ES – Eurosiberian Region, I – Indian Region.

the First and Hazratishoh Mts. contain deformed and metamorphosed Precambrian and Paleozoic deposits of sandstone, limestone and marl. In the Rushan-Pshart zone, a Perm-Trias alternation of marine sediments, predominantly limestone and radiolarites is represented. Additionally, outcrops of magmatic origin like pillow-basalt, andesite, tuffs and also lenses of ultramafic rocks have been reported.

The southern ranges of the Pamir-Alai system are composed of metamorphic Precambrian rocks and Mesozoic and Paleogene granites (Pashkov & Budanov, 1990). The oldest rocks such as late Carboniferous to early Permian sandstone, siltstone, clay and limestone are overlaid by Triassic limestone, radiolarite and siltstone with intrusions of basaltic lava and tuff.

Moving to the south-west, the Pamir-Alai ranges submerge into the Tajik Sedimentary Basin. In the Early Cretaceous, marine sediments of limestone, marl and clay were deposited in this area. The thickness of the sedimentation layer is rich up to 1,400 meters and it contains sandstone, gypsum, clay, limestone and conglomerates (Lohr, 2001). In the outer Pamir, along the Zeravshanian and Turkestanian ranges,

Cambrian and Silurian sediments predominate. The rocks here are generally limestone (micritic, bitumic, marly and dolomitic coral limestone), marble, dolomite, dolomitic shale, clay shale, phyllitic schist and argillaceous slates.

The soil cover of the Pamir-Alai mountains is considerably affected by the relief (30% of the territory has slope inclinations of about 20 degrees or more) and geological history of the particular site. In addition, the precipitation and related vegetation cover influence the soil type significantly. Soils are mostly constituted of debris materials, ranging from sand to coarse gravel and rocks in the mountains. Only in the depressions and valley bottoms does the fine material (mainly loess and silt) support the fine-particles substrates. The typical soils of the montane and subalpine belts of the Pamir-Alai are kastanozems, with a considerable content of organic matter allowing the development of steppe communities. In the more extreme climatic conditions - in the lower foothills and the highest altitudes of the eastern Pamir - burozems and grey soils prevail, which have a thinner topsoil layer and higher content of rock debris or sand deposits. These kinds of soil support so-called deserted or cryophilous steppes and alpine swards. Topsoils are poor in organic matter and rich in minerals, reflecting the aridity. In sandy regions of the Fergana Basin and Tajik depression, as well as the eastern Pamir mountain semi-deserts, arenosols and even poor sandy dunes may develop. Leontieva (1968) distinguished within Tajikistan four main soil zones: the grey soils of the uplands and montane areas (mainly brown calcareous), soils of moderately high mountains (generally brown acidophilous), soils

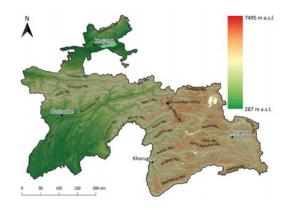


Figure 2. The main mountain ranges of Tajikistan.

of alpine mountain belts with steppes and glaciers (weakly developed leptosols), and the underdeveloped soils of high mountain deserts. In the lowest depressions and in some parts of highly elevated plateaus the climatic conditions, low precipitation and high evapotranspiration result in formation of spatially restricted solonchaks and solonetz soils.

CLIMATE

According to the bioclimatic classification, which mainly takes into account precipitation (P) and temperature (T) values, the study area can be classified within the Mediterranean type of macrobioclimate (Rivas-Martínez et al., 2011). This type of climate is characterised by a summer drought lasting for at least two consecutive months in which P < 2T. Moreover, other bioclimatic features of the study area support its classification within the Mediterranean macrobioclimate. The average annual temperature is below 25 °C (ca. 2 °C) and the Compensated Thermicity Index is below 580 (ca. 80). The Continentality Index is ca. 31, thus our research area fits the continental type (eucontinental subtype) known to be suitable for treeless steppe vegetation. The Ombrotype Index (ca. 14) confines the study area within the upper, humid horizon (with the exception of the eastern Pamir-Alai with fairly arid conditions). Recent research on the SW and Central Asia bioclimate suggests that the Irano-Turanian bioclimatic zone should be distinguished by higher continentalism, lower precipitation (particularly during winter), a longer dry season and lower winter temperature minima from the Mediterranean one. It is also distinct if compared to the Central Asian climate because of lower and unequal precipitation (with an apparent spring peak), a drier summer season and lower continentalism (Djamali et al., 2012). The area has generally a high level of solar insolation (2,090–3,160 sunshine hours), a low percentage of cloud cover, high-amplitude of annual temperatures as well as moderate humidity and precipitation, with the exception of the spring period when there is a considerable amount of rainfall. In the alpine belt of the high mountains, the climate is harsher, with average temperatures in July between 9.7°C and 13.5°C. Annual precipitation ranges in the western Pamir-Alai from ca. 350 mm (Zeravshan Mts.) to ca. 600 mm in the Hissar Range (in some locations up to 2,000 mm). In the western part of the country, the lower limit of permanent snow is at an altitude of 3,500–3,600 m a.s.l.; and at 5,800 m a.s.l. – in its eastern regions (Latipova, 1968; I. K. Narzikulov & Stanyukovich, 1968; Safarov, 2003).

FLORA AND PHYTOGEOGRAPHY

The geographical location of Tajikistan is favourable to high floristic diversity. Positioned between the continental Asian deserts (Takla-Makan) in the east and vast warm lowlands in the west, linked with the Himalayas through the Karakorum ridge in the south-east, Kunlun in the east and Tian-Shan in the north-east, with other connection via Hindukush and Kopet-dagh in the south-west and west – all having vertical belts from hot to permafrost deserts – it offers an outstanding range of biotopes for plants. With one of the largest altitudinal amplitude in the world, extreme precipitation and temperature fluctuations, a considerable glacier cover and diverse geology, the country promotes a great number of plant species including many altitudinal and ecological vicariants that occur in many cases in a single, isolated valley or mountain ridge (e.g. the Scutellaria, Nepeta, Allium and Cousinia genera). It is also important that the Pamir-Alai mountains are located within the borderland between two important biogeographic regions: Central Asia (with considerable boreal influences) and Middle Asia (typical Irano-Turanian area with Mediterranean-like climate). The historical foundation for the country's plant richness is also related to the climate aridisation, fall of average temperatures and mountain orogenesis that occurred during last 2–5 million years (late Neogene and Quaternary). The Middle Asian mountains have been recognised by Conservation International to be amongst thirty-six so-called hotspots of biodiversity (CEPF.net – The Biodiversity Hotspots 2019; Mittermeier et al., 2011) and as one of the eleven most important focal points of future plant diversity studies and conservation (Giam et al., 2010).

The uniqueness of the Tajik flora has attracted many famous botanists, e.g. A. Leman, A.P. Fedtschenko, O.A. Fedtschenko, A.E. Regel, W.L. Komarov, S. I. Korzhinskii, V.I. Lipskii, B. A. Fedtschenko, O.E. Knorring-Neustrueva, M.G. Popov, O. Paulsen or J. Bornmüller, conducting here their pioneering botanical research at the turn of the 19th and 20th centuries. The second half of the 19th century was also the time of Leon Barszczewski's exploration in Middle Asia (mainly Bukhara Province). Barszczewski was the Polish officer in the Russian army who discovered Pamir-Alai for further research (Strojecki, 2016; Photo 1). He attracted many famous botanists, particularly Vladimir Lipskii, who assisted Barszczewski in two expeditions. They collected a number of species, two of which - namely Onosma barsczewski and Allium barsczewski - are named after the Polish explorer.

The first half of the twentieth century was very advantageous and fruitful in terms of synthetic monographs, e.g. regarding plant taxonomy, phytogeography and vegetation research (Chukavina,







Photo 1. Leon Barszczewski - Polish ethnographer, geologist and naturalist in his office in Samarkanda in the uniform of Russian Army with inflorescence of Allium barszewskii and Onosma barszewskii - species growing in steppes and screes of Zeravshan Mts.

Table 1. Taxonomic richness and uniqueness of particular families of Tajikistan (after Nowak, Nowak, et al., 2011; Nowak & Nobis, 2010, supplemented).

Family	Number of species	Number of genera	Number of endemics
Asteraceae	660	118	250
Fabaceae	520	40	297
Poaceae	336	91	68
Brassicaceae	248	85	73
Lamiaceae	196	38	98
Apiaceae	171	66	77
Rosaceae	132	27	46
Caryophyllaceae	151	26	69
Chenopodiaceae	144	39	27
Boraginaceae	130	32	43

1984; A. P. Fedtschenko & Fedtschenko, 1905, 1906–1916; B. A. Fedtschenko, 1915, 1925; Grigorev, 1944; Kaletkina, 1971; Kinzikaeva, 1988; Kochkareva, 1986; Konnov, 1974; Lipskii, 1902-1905, 1904; Ovchinnikov, 1948, 1957, 1963, 1968, 1975, 1978, 1981; Pisyaukova, 1951; Rasulova, 1991; Stanyukovich, 1948). Nevertheless, there is still no comprehensive and reliable data on the number of species and their distribution for Tajikistan. According to various researchers, the flora of this country consists of ca. 4,500-5,000 vascular plant species (Ovchinnikov, 1957; Rasulova, 1991; Stanyukovich, 1982) but still a comprehensive checklist is lacking and our examinations suggest that the final number of spontaneously occurring species is lower (Table 1).

Recent detailed studies conducted in the country have brought some new findings, but at the same time eliminated several taxa reported only from cultivation or having a doubtful status in this territory. Many species included in the Tajiks 10-volume flora were reported only from surrounding areas and not confirmed within the country. Thus currently, the flora of Tajikistan consists of 4,288 taxa (including 47 subspecies), which are not evenly distributed across geobotanical subregions (see Figure 3) – with the richest being Zeravshanian B (1,499 taxa), Hissaro-Darvasian A (1,440), South-Tajikistanian B (1,407) and South-Tajikistanian A (1,324; Figure 4).

The distribution pattern of the species richness is somehow different if we relate species number to the area of a particular geobotanical subregion. Then, the small regions of the Mogoltausian Mts., the eastern Turkestan range and the southern outskirts of the Darvaz range take precedence. To the contrary, the large subregions with harsh climatic conditions reveal the species poverty with the Eastern Pamir as being the poorest one (Figure 5)

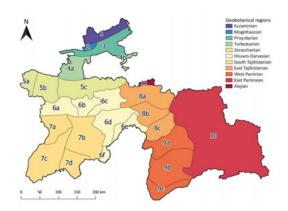


Figure 3. The phytogeographical division of Tajikistan: 1 – Kuraminian; 2 – Mogoltausian; 3 – Prisyrdarian; 4a – Turkestanian A, 4b – Turkestanian B; 5a – Zeravshanian A, 5b – Zeravshanian B, 5c – Zeravshanian C; 6a – Hissaro-Darvasian A, 6b – Hissaro-Darvasian B, 6c – Hissaro-Darvasian C, 6d – Hissaro-Darvasian D, 6e – Hissaro-Darvasian E, 6f – Hissaro-Darvasian F; 7a – South Tajikistanian A, 7b – South Tajikistanian B, 7c – South Tajikistanian C, 7d – South Tajikistanian D; 8a – East Tajikistanian A, 8b – East Tajikistanian B, 8c – East Tajikistanian C; 9a – West Pamirian A, 9b – West Pamirian B, 9c – West Pamirian C; 10 – East Pamirian; 11 – Alaian.

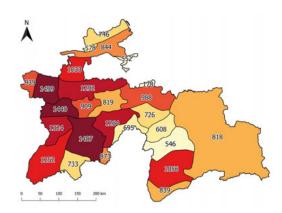


Figure 4. The floristic richness of the phytogeographic subregions of Tajikistan – number of vascular plant species in each subregion.

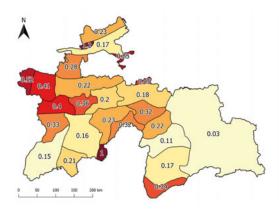


Figure 5. Relative floristic richness calculated based on the number of species and the size of particular phytogeographic subregions distinguished within Tajikistan.

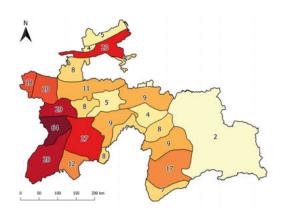


Figure 6. Richness of alien plant species established in Tajikistan across the geobotanical subregions distinguished within the country.

The majority of species are native, spontaneously settled plants in the area of the country. However, the long human presence in Tajikistan causes some changes in the composition of the flora. In the country, 159 species of alien origin (3.7% of the total flora) have been reported (Figure 5). They include 10 suspected archaeophytes, 84 neophytes, and 65 ephemerophytes The most widely distributed neophytes are e.g.: Amaranthus retroflexus, Aster salignus, Bidens frondosa, Cannabis ruderalis, Cuscuta campestris, Datura stramonium, Galinsoga ciliata, Isatis tinctoria, Medicago romanica, Rubus praecox, Rudbeckia laciniata, Salix babylonica and Ulmus pumila. They represent species of mainly American and Mediterranean origin and prefer agroecosystems (arable fields, fallow lands, intensively used pastures), road verges, city centers and other disturbed habitats. Only a few species are of Australian (e.g. Acalypha australis) or African (e.g. Sorghum sudanense) origin. Neophytes are spread across the country, however, they are considerably more frequent in lowland and foothill zones where agricultural and ruderal habitats occupy the highest proportion of the territory (Figure 6). Among the species that were probably introduced before 1500 A.D. and defined as archaeophytes, Adonis aestivalis, Agrostemma githago, Armoracia rusticana, Chrysanthemum segetum, Lathyrus sativus and Sorghum halepense occur in Tajikistan. They have a strong affinity to segetal plant communities, however, in the territory of Tajikistan many of them also occupy ruderal sites.

Phytogeographic composition of the Tajik flora

The flora of Tajikistan is clearly distinguished by a domination of the Irano-Turanian species. This group includes ca. 65% of the total species number. Additionally, the Central Asian species (the group of Irano-Turanian element with the eastern occupational area in continental and highly elevated Central Asia) brings a further 5.3%. Altogether, the Irano-Turanian element strongly predominate, with more that 70% of the total number of plant species. Beside ca. 1,400 endemic taxa in the flora of Tajikistan, there are a range of plants that are restricted to the area between the south-western part of Tajikistan and the Iranian uplands. These are, for example, Allium praemixtum, Allochrusa paniculata, Amberboa bucharica, Amygdalus bucharica, Artemisia turanica, Eleocharis mitracarpa, Euphorbia granulata, Ferula bucharica, Frankenia bucharica, Iris halophila var. sogdiana, Kochia iranica, Koelpinia turanica, Malva bucharica, Meristotropis bucharica, Microcephala turcomanica, Nonea turcomanica, Phlomis bucharica, Piptatherum sogdianum, Prangos bucharica, Pyrus korshinskyi, Veronica bucharica and others.

The group of the eastern Irano-Turanian species that have occupational ranges within the mountains, steppes and high plateaus of Central Asia, includes: Acantholimon diapensioides, Ajania tibetica, Aphragmus oxycarpus, Artemisia pamirica, Astragalus falconeri, Carex pamirensis, Christolea crassifolia var. pamirica, Cousinia auriculata, Crepidifolium tenuifolium, Dilophia salsa, Elymus nutans, Ephedra intermedia, Leiospora eriocalyx, Leontopodium nanum, Lonicera pamirica, Oxytropis gorbunovii, Pedicularis semenowii, Ranunculus badachschanicus, Saussurea leucophylla, Seriphidium skornia-kovii, Stipa glareosa and S. subsessiliflora.

About 10% of species in the Tajik flora represent the group with the main distributional range in the Mediterranean area (Figure 7). It is related to the similarities in climatic conditions and the origin of the Irano-Turanian floras (see Kamelin, 2017). The species prefer the lower alpine, montane and submontane zones of the western sections within the Pamir-Alai ranges. Examples of typically Mediterranean taxa include: Althaea ludwigii, Avena fatua, Brassica rapa, Centaurium spicatum, Crambe orientalis, Cressa cretica, Cynoglossum creticum, Hordeum spontaneum, Jasminum officinale, Lallemantia iberica, Papaver orientale, Parietaria lusitanica subsp. serbica, Phleum himalaicum, Rochelia disperma subsp. retorta, Salix aegyptiaca and Sclerochloa woronowii.

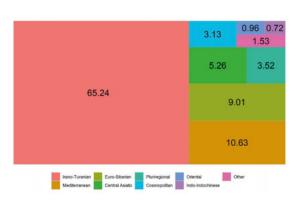


Figure 7. Phytogeographical composition of the flora of Tajikistan.

The next group of the Tajik flora includes species with the core occupation area in the temperate Euro-

Siberian zone. They reach the southernmost limits of their range in the northern Pamir-Alai and Tian-Shan Mts, often inhabit relatively cold subalpine and alpine belts. This group of taxa is represented by *Allium ramosum*, *Asparagus officinalis*, *Carex diandra*, *Potentilla crantzii*, *Rumex thyrsiflorus*, *Salix pentandra*, *S. triandra*, *Stipa capillata* and *Trifolium repens*.

Pluriregional species are not numerous. They constitute 3.5% of the total flora and are distributed across the whole Old World, particularly in Euro-Siberia, the Mediterranean, Irano-Turanian, Eastern Asian, Indo-Chinese, North African and sometimes Circumboreal provinces. The group includes: Alliaria petiolata, Arabidopsis thaliana, Artemisia vulgaris, Bromus sterilis, Catabrosa aquatica, Centaurium pulchellum, Chenopodium hybridum, Cuscuta epithymum, Echium vulgare, Erodium cicutarium, Geranium pusillum, Holosteum umbellatum, Hypericum perforatum, Lepidium latifolium, Medicago sativa, Myosotis alpestris, Oxyria digyna, Plantago major, Potamogeton friesii, Prunella vulgaris, Rubus caesius, Solanum nigrum, Symphyotrichum graminifolium and Vicia angustifolia.

The cosmopolitan species i.e. species with world-wide distribution are not numerous in the flora of Tajikistan. They are often related to anthropogenic habitats such as fields, road verges or ruderal places in human settlements. The group includes also many aquatic or littoral species. The most common are Achillea millefolium, Alisma plantago-aquatica, Anagallis arvensis, Artemisia annua, Brachiaria eruciformis, Calystegia sepium, Capsella bursa-pastoris, Cichorium intybus, Cynodon dactylon, Cyperus difformis, Digitaria sanguinalis, Eragrostis pilosa, Ipomoea purpurea, Malva neglecta, Najas marina, Potamogeton crispus, Ricinus communis and Sigesbeckia orientalis.

An interesting addition to the flora of Tajikistan are species representing the East Asian element (Oriental), including *Eucommia ulmoides*, *Morus alba*, *Muhlenbergia huegelii*, *Persicaria nepalensis*, *P. orientalis*, *Pyrus ussuriensis*, and reported from the rice fields – *Sagittaria trifolia*. Also, *Ulmus pumila*, that was probably planted, then escaped and established in many sites, is of East Asian origin.

Rice fields and other crops are the main habitat for species of Indo- and Indo-Chinese origin. The most common are weedy taxa of paddy fields such as: Ammannia auriculata, A. multiflora, Dopatrium junceum, Eriocaulon cinereum, Fimbristylis quinquangularis, Gastrocotyle hispida, Physalis hermanni, Rotala indica,

Schoenoplectiella juncoides, Schoenoplectus littoralis, Sphenoclea zeylanica and Strigosella brevipes. Some examples of this group, originating from Southeast Asia, are now distributed across Tropical and Subtropical zones in man-made habitats, e.g. Ammannia baccifera, Eleusine indica, Najas graminea and Ludwigia perennis.

The south-western outskirts of the Pamir-Alai ranges, e.g. the Hazratishoh or Babatag Mts. provide suitable habitats for Saharo-Sindian taxa that have core distribution areas far to the west in southern Iraq, Egypt and other deserted lands of northern Africa. Examples are *Crepis kotschyana*, *Gossypium herbaceum*, *Heliotropium supinum*, *Nanorrhinum ramosissimum* and *Sorghum* × *drummondii*.

Other geographical groups are poorly represented. The Arctic-alpine species are represented by Braya humilis, Carex microglochin, Chamaerion latifolium, Lloydia serotina, Luzula spicata, Ranunculus kamchaticus, Saxifraga hirculus, Sagina saginoides, Saxifraga oppositifolia, Silene uralensis subsp. apetala and Trichophorum pumilum. These plants grow in the highest elevations in chionophilous grasslands or fens of Eastern Pamir and are sometimes restricted only to the mountain summits. Another group of species preferring the highest altitudes are plants with the range along the Himalayan Mts. Examples are: Aconitum rotundifolium, Alopecurus himalaicus, Bergenia stracheyi, Oberna wallichiana, Rumex nepalensis, Saxifraga stenophylla, Sedum ewersii and Sibbaldia tetrandra.

The Pamiro-Alaian flora has a transitional character as the mountain system is located between vast, desert areas towards the south-east and highly elevated ranges and plateaus towards the west and north-west. This phytogeographic knot is hardly resolvable at the finer scale as the borderlands of phytogeographic units are located in a mountainous area with an extraordinary complicated relief with bending valley bottoms at 500–800 m and summits higher than 7,000 m a.s.l. Additionally, the vegetation of Tajikistan underwent long-lasting human pressure, with grazing as the most influential over the centuries.

Traditional grazing of livestock has a crucial meaning when analysing the ecological arrangement of the Tajik flora. The human interest to enlarge pasturelands causes a tremendous habitat change, seriously diminished forested lands and increased grassland. This brings about the domination of steppe plants in the flora of Tajikistan (Table 2). Examples of prominent genera that evolve effective

defence strategies against ungulates and contribute to steppe vegetation are *Stipa* spp., *Bromus* spp., *Avena* spp., *Elymus* spp., *Elytrigia* spp. and *Agropyron* spp. At higher elevations – particularly in Eastern Pamir and the alpine belt in west Pamir-Alai ranges – *Kobresia* spp. and *Poa* spp. take advantage and dominate the summer pastures.

The mountainous landscape of Tajikistan is dominated by rocks, screes and landslides that occupy more than 30% of the territory. Chasmophytic habitats are very important hotspots of plant diversity, harbouring together ca. 1,500 species. This group comprises a huge number of endemics representing Achoriphragma, Asperula, Campanula, Dionysia, Leiospora, Parrya, Rosularia, Scutellaria and Tanacetopsis genera on rock faces and Acanthophyllum, Chesneya, Cousinia, Nepeta, Onosma, Piptatherum, Scrophularia and Trigonella genera on screes. A kind of species trap are riverbeds with different gravel and sandy debris. These habitats are inhabited by plants originating from different neighbouring vegetation such as screes, rocks, riverside forests and anthropogenic habitats. Among the most frequent are: Launaea procumbens, Pleioneura griffithiana, Trifolium fragiferum, Tripleurospermum disciforme and Verbascum songaricum.

One of the most valuable and iconic plant groups related to Tajikistan are bulbiferous geophytes. Almost thirty species of tulips (Tulipa spp.) originated from this country, with 90% of them being endemic. They make up the spring aspect of meadow, steppe and forb vegetation, mainly in colline, montane and subalpine zones. The genus Gagea is more diverse. It is represented by 33 species, and 13 of them have the status of national endemics, with Gagea exilis, G. filiformis, G. gymnopoda, G. holochiton and G. incrustata as the most narrowly distributed. Another ornamental group of geophyte species are foxtail lilies (Eremurus spp.). Tajikistan is a centre of occurrence of 29 Eremurus taxa, half of them are endemic to Tajikistan. There are several other decorative bulbs with a blooming period in early spring that attract amateur and professional botanists to conduct field excursions in March and April. Among them are Juno (13 species), Ungernia (3 species), Fritillaria (9 species) as being the most prominent. During summer the showiest is the genus Allium with more than 130 species. It is one of the most renowned group of taxa that has the centre of its geographical distribution in Middle Asia. Many of its representatives, e.g. Allium

Table 2. The species pool of a particular habitat type in Tajikistan expressed by the species percentage of the total flora.

Habitat	Percentage of flora [%]	Habitat	Percentage of flora [%]
Steppes	30.8	Pastures	3.2
Screes	24.7	Broad-leaved forests	3.1
River beds	15.6	Salt shrubs	2.8
Fields	14.7	Alpine semi-deserts	2.4
Rocks	11.5	Littoral vegetation	2.3
Xeric shrubs	11.1	Nival fens	2.0
Semi-savannas	10.9	Moraines	1.9
Scree shrubs	10.3	Alpine grasslands	1.8
Juniper stands	8.9	Fallow lands	1.5
Ruderal	7.5	Springs	1.5
Fens and mires	7.5	Orchards	1.2
Loose sand screes	6.3	Dunes	1.0
Salt marshes	6.1	Lakes	0.9
Forbs	6.1	Deserts	0.7
Alpine steppes	5.9	Alpine ponds	0.7
Riverside forests	5.7	Nival vegetation	0.6
Meadows	5.0	Alpine riverside forests	0.6
Semi-deserts	5.0	Nitrophilous rock footings	0.4
Maple dry forests	4.5	Rivers	0.3
Alpine meadows	4.1		

brevidens, A. darwasicum or A. komarowii are endemic to the country.

When speaking about the floristic richness, it should be also mentioned that Tajikistan is a homeland of many cultivated species and plants of considerable economic value. Globally important are: *Hordeum bulbosum, Fritillaria regelii, Tulipa subquinquefolia, Punica granatum, Ficus carica* and others. Commonly known wild fruits originating from Tajikistan include e.g. the wild apple *Malus sieversii*, walnut *Juglans regia*, pistachio *Pistacia* spp., plum *Prunus* spp. and almond *Amygdalus* spp.

MAJOR VEGETATION TYPES

The vegetation of Tajikistan is fairly diverse andcan be divided into 20 main types: mesophilous deciduous forests (so-called Chernolesya), riverside forests (Belolesya), riverbed forests (Thugay), xerothermophilous shrubs (Shiblyak), alpine coniferous forests (Artschevniki), riverbed shrubs, meadows and pastures, segetal vegetation, alpine meadows and swards, steppes and socalled semisavannas, xerothermophilous swards, xerothermophilous dwarf bushes, desert and semi-desert vegetation, fen-spring vegetation (sazy), tall-herb vegetation, rush vegetation, aquatic vegetation, scree and slide-rock vegetation, rock vegetation (petriphyton) and salt marsh vegetation. Within this vegetation types ca. 200 plant associations can be distinguished. However, there are still many underinvestigated areas both in the mountains and in the lowlands, which makes the list of plant communities still incomplete. In particular, a huge areas of pasturelands, rock vegetation of nival and alpine zones and the eastern Pamir semi-deserts and cryophilous steppes need to be examined in detail. Furthermore, forbs, mesic xerothermophilous shrubs and dry xeric scrubs should be assigned to a priority list of indispensable research.

FORESTS

Mesophilous deciduous forests

Forests in Tajikistan are typically broad-leaved, riparian or gallery woods covering mainly the lowland, colline, montane and subalpine zones on the northern slopes in several mountain ranges and river valleys. It was found that only among deciduous woods ten associations in the Pamir-Alai ranges can be distinguished. They are assigned to four alliances reflecting gradient of fertility, salinity and altitude.

The first group comprises typical mesophilous stands assigned to *Acero turkestanici-Juglandion regiae*. They are deciduous, mesophilous woods on moist habitats, on fertile and deep brown soils. The most common is a zonal forest dominated by *Juglans regia* (*Juglandetum regiae*) growing on northern slopes mainly in the Hissar-Darvaz ranges, preferably on northern slopes in colline and montane belt (Nowak et al., 2017; Photo 2).



Photo 2. Juglans regia stand in the Takob River Valley (Hissar Mts.).

The most frequent and diagnostic taxa for this community are *Brachypodium sylvaticum*, *Cardamine impatiens*, *Carex cuprina*, *Impatiens parviflora*, *Juglans regia*, *Milium effusum* and *Poa nemoralis*. The walnut forests are an important refugee for relict plants since the valley bottoms of the Hissar and Darvaz ranges were not glaciated during the last glaciation. Among others, a range of endemic plants including *Astomaea galiocarpa*, *Asyneuma argutum* subsp. *baldshuanicum*, *Cornus darvasica*,

Exochorda racemosa, Ligularia altissima, Ostrowskia magnifica, Oxytropis mumynabadensis, Pyrus lindleyi and Viola fedtschenkoana inhabit the walnut stands.

Within the same altitudinal belt, on slightly higher elevations and on shallower, lithomorphic soils with considerable gravel or rock ingredient develop stands with *Acer platanoides* subsp. *turkestanicum*. The community is reported from the whole area of Tajikistan except the eastern Pamir. Due to considerable human impact it often has the form of sparse groves with underdeveloped canopy layer. Apart from Turkestan maple, the most constant species that contribute to this community are *Allium rosenbachianum*, *Asparagus neglectus*, *Cicerbita zeravschanica*, *Dictamnus albus*, *Galium aparine*, *G. vassilczenkoi*, *Impatiens parviflora*, *Ligularia thomsonii*, *Poa nemoralis* and *Vicia tenuifolia*.

On the northern slopes of the Darvaz range, on deep, humid and slightly alkaline soils, stands with a domination of white poplar were described as *Violo suavis-Populetum albae* (Photo 3).



Photo 3. Forest representing *Violo suavis-Populetum albae* association on the northern slopes of Darvaz range near Tavildara.

It harbours a lot of tall-herb species that build their own communities in forest gaps, clearings or form the undergrowth. The most frequent include: Astragalus eupeplus, Crepis sibirica, Eremurus aitchisonii, Leonurus turkestanicus, Ligularia thomsonii, Lindelofia stylosa, Picris nuristanica, Prunus ulmifolia, Rhamnus dolichophylla and Viola suavis.

The most fertile and deep soils are occupied by the stands of Platanus orientalis (Photo 4). This association - defined as Swido darvasicae-Platanetum orientalis - is recorded in the warmest, mostly wet habitats in the river valleys of southern Tajikistan. Besides river valleys, it grows along slope brooks and around springs. The dense canopy is clearly dominated by Platanus orientalis and supplemented by Populus alba. The lower tree layer consists of Diospyros lotus or Celtis sinensis. In the shrub layer, the most abundant are Rosa canina, Cornus darvasica and Cotoneaster multiflorus. The undergrowth consists of Brachypodium sylvaticum, Clinopodium integerrimum, Epipactis royleana, Geum urbanum, Impatiens parviflora, Melissa officinalis, Ophioglossum bucharicum, Poa nemoralis, P. pratensis, Scrophularia nodosa, Stellaria neglecta and Viola suavis (Nowak et al., 2017; Zapryagaeva, 1976).

It is worth mentioning that within the broad-leaved mesophilous forests, the community of *Malus sieversii* is distinguished by some authors (Sidorenko, 1971; Stanyukovich, 1982), a very important fruit tree for the human economy.



Photo 4. A stand of *Platanus orientalis* in the Panj River Valley near Qualaykhum.

River carr forests of montane stream valleys

This type of wood vegetation is distinguished as the *Populion afghanicae* alliance and has the elevational centre of occurrence in the montane up to subalpine belts. The phytocoenoses occupy valley bottoms of streams and mountainous brooks, sometimes also on gentle slopes with water outflows. Typical species for this vegetation are *Equisetum arvense*, *Populus afghanica*, *Armeniaca vulgaris*, *Euonymus koopmanii* and *Berberis integerrima*.

In the Pamir-Alai between 1,000 and 2,000 m a.s.l., particularly in the Hissar, Darvaz, Karateginian, Vakhsh and Peter the First mountains, stands of *Fraxinus sogdiana* were noted (Chukavina, 1984; Zapryagaeva, 1976). *Fraxinetum sogdianae* grows in deeply eroded, narrow river valleys close to the water courses (Photo 5).



Photo 5. A patchy stand of *Fraxinetum sogdianae* in the deep valley of Kshtut in the Zeravshan Mts.

The stands prefer fertile, relatively deep and alkaline soils with a considerable content of organic matter. The most constant species include: Arctium lappa, Asperuginoides axillaris, Galium aparine, Impatiens parviflora, Lonicera korolkowii, Fraxinus sogdiana and Poa pratensis.

Similar to sogdian ash carrs are the stands with domination of *Betula turkestanica* and *B. tianschanica* (Photo 6).

They occupy slightly higher locations in the bottoms of the V-shaped mountain valleys in montane and subalpine zones with fairly well-developed soil profile. This type of *belolesya* is one of the most widespread riparian forests across Pamir-Alai. It is probably linked to European boreosubarctic and orotemperate birch woods on nutrient-



Photo 6. Riverside birch wood with domination of *Betula turke-stanica* and *B. tianschanica* in the Arch Valley in the Zeravshan Mts.

poor podzolic soils known from the Alps and Pyrenees (Vaccinio myrtilli-Betuletalia pubescentis; Mucina et al., 2016). Within the community, species typical for the montane and even colline belts dominate in the herbaceous layer (e.g. Ranunculus distans, Dactylis glomerata) as opposed to the communities of Populion talassicae. Other frequent taxa include Aquilegia atrovinosa, Carex decaulescens, Galium turkestanicum, Iris halophila var. sogdiana, Polygonatum roseum, Rubus caesius, Solidago kuhistanica and Vinca erecta.

River carr forests of subalpine stream valleys

This group includes poplar and birch forest communities developing in the higher montane and subalpine elevations along rivers with high discharge or in the estuary areas of mountainous lakes of the Pamir-Alai Mountains. They often stretch up to tree line at elevations higher than 3,000 m a.s.l.

The highest locations occupy stands with *Populus pamirica*. It is a typical subalpine forest community, developing close to the river beds, sometimes almost on pure gravel deposits. It was found in the Eastern Pamir, more rarely in western Pamir and the Darvaz Mts. (Nowak, Nobis, et al., 2015; Zapryagaeva, 1976; Photo 7). The most typical species that contribute to this wood are *Agrostis gigantea*, *Calamagrostis pseudophragmites*, *Carex stenophylla* subsp. *stenophylloides*, *Hippophaë rhamnoides*, *Lactuca tatarica*, *Populus pamirica* and *Rosa huntica*.

A wider altitudinal amplitude has the shrubby Salicetum turanico-pycnostachyae, that occurs closer to the river gravel beds. The soil profile is poorly developed here and the vegetation is under strong grazing pressure by ungulates. Stands look like dense, hard to access thickets made up of small trees or large shrubs. The shrub layer consists mainly of Lonicera stenantha, Hippophaë rhamnoides and Rosa huntica. Additionally, in the undergrowth Agrostis canina, Astragalus tibetanus, Hordeum brevisubulatum, Poa pratensis, Salix blakii and Taraxacum officinale occur.

Along the shoreline of Iskander-kul Lake in the Zeravshan Mts., endemic stands of *Populus talassica* are reported (Photo 8). The *Populetum talassicae* prefers a subalpine landscape and has a number of typically alpine species that frequently contribute to the association (e.g. *Trifolium seravschanicum*, *Pedicularis olgae* and *Gentianopsis stricta*; Nowak & Nobis, 2013). The most important species that frequently contribute to the association are *Carex capillaris*, *Neottia camtschatea*, *Pedicularis dolichorrhiza*, *Polygonatum roseum* and *Vicia tenuifolia*.



Photo 7. Populetum pamiricae along the Ghunt River north to Khorogh.

Gallery forests in lowland river valleys

In south-western Tajikistan, in the confluence area of the big Pamir-Alai rivers such as Panj or Wakhsh, the association with domination of *Populus pruinosa* develops on wet, marshy and frequently inundated



Photo 8. Populetum talassicae neighbouring the Iskander-kul Lake in the Zeravshan Mts.

areas with increased salinity. This association was formerly reported as a part of the so-called 'thugay' vegetation – the riverbed shrubs and forests (Photo 9). In a recent revision of the Tajik forest communities (Nowak et al., 2017), this type of thermophilous woods reveals the close relation to gallery stands of the Mediterranean. The plots of this sparse *Populus pruinosa* stands are composed of *Arundo donax*, *Elaeagnus angustifolia*, *Glycyrrhiza glabra*, *Karelinia caspia*,



Photo 9. The gallery forests of *Populus pruinosa* in the confluence area of Panj or Wakhsh Rivers near Tigrovaya Balka National Park.

Limonium reniforme, Saccharum ravennae, Saussurea kabadiana, Tamarix ramosissima and Zygophyllum oxianum. They occupy low river terraces with a shallow ground water table and numerous oxbow lakes, ditches and marshlands.

RIVERBED SCRUB VEGETATION

Riverbed vegetation is sometimes called 'thugay' (Nowak et al., 2017). However, the difference is considerable between the gallery forest located at ca. 500 m a.s.l. and alpine river thickets at 3,500 m. They are completely distinct in terms of species composition, climate and habitat requirements. The lowland thermophilous woods are related to mediterranean Nerio-Tamaricetea (with considerable cover of Tamarix spp.), and the dense thickets of Hippophaë rhamnoides within gravel deposits of alpine streams should be excluded from this class. This kind of vegetation is similar to the plant communities noted along river beds in the Karakorum Mts. (northern Pakistan; Eberhardt, 2004). Despite the alliance is being assigned to rather different habitats that river beds, considering the occupational areas in Pamir-Alai, in our opinion it is a typical river bed thicket vegetation that can be compared to alpine Salicion elaeagno-daphnoidis in Europe. The range of river bed shrubs is restricted between 1,000-4,000 m a.s.l. The phytocoenoses consist mainly of Hippophaë rhamnoides, Equisetum ramosissimum, Calamagrostis pseudophragmites, Lonicera asperifolia, L. korolkowii, L. pamirica, L. spinosa, L. stenantha, Paracynoglossum geometricum, Salix blakii, S. capusii, S. iliensis, S. pycnostachya and S. wilhelmsiana (Photo 10). It is worth mentioning that river bed vegetation – due to its openness – traps a very large number of species from surrounding habitats, mainly screes and fields (almost 700).

Another type of river bed vegetation is *Myricaria* scrub. In Tajikistan two associations of *Myricaria* squamosa and M. bracteata being a vicariant of European M. germanica community are distinguished (Photo 11). In the alpine belt, communities of *Clematis tangutica* or *Chamaenerion latifolium* developing on gravel beds of Eastern Pamir rivers and streams were found (Photo 12).

In Western Pamir, along the Panj River, a community of *Berberis nummularia* at altitudes of ca. 1,600–2,000 m a.s.l. was observed on the gravel



Photo 10. The dense thicket of *Salix capusii* and *Hippophaë rhamnoides* in the Zeravshan Mts.



Photo 11. A shrubby community of *Myricaria bracteata* shrubs in the wide valley of Zeravshan River near Sudzhina.

terraces. The most fresh deposits of gravel and sand, close to the river current, are covered by sparse vegetation dominated by *Calamagrostis pseudophragmites* or *Glycyrrhiza glabra*. Moreover, communities of *Incarvillea olgae* and *Datisca cannabina* have been spotted on fresh gravel deposits as side tributaries cones or in gravelly river banks.

There are also thermophilous river bed shrubs of *Tamarix* spp. in the Amu Darya and Syr Darya River Valleys (*T. ramosissima*, *T. smyrnensis*, *T. florida*, *T. arceuthoides*) as well as *Halimodendron halodendron* community in salty places or *Vitex agnus-castus* (Photo 13). They occupy the warmest sites at altitudes of 300–750 m a.s.l. and form the shrubby successional stage previous to gallery forest of *Populus pruinosa*. They



Photo 12. Community of *Chamaenerion latifolium* developed on gravel debris along a tributary of the Ghunt River (Eastern Pamir).

were included by some authors in so-called savannoid vegetation with a short winter dormancy period as a relict of warmer periods (Stanyukovich, 1982). They include communities of Saccharum ravennae, S. spontaneum and Imperata cylindrica with contribution of Alhagi canescens, Arundo donax, Calamagrostis dubia, Elaeagnus angustifolia, E. orientalis, Glycyrrhiza glabra, Phragmites australis, Suaeda paradoxa, Typha angustifolia and Trachomitum scabrum Photo 14).

THERMOPHILOUS ORCHARDS AND SHRUBS

This type of vegetation, so-called 'shiblyak', is known from colline and montane belts of the Hissaro-Darvasian, Kuraminian, Zeravshanian,



Photo 13. Community with *Tamarix ramosissima* in the Zeravshan Valley near Sudzhina.



Photo 14. Community with *Saccharum spontaneum* in the Panj River Valley near Dashtijum National Park.

Karatau, Aktau and Babatag ranges, as well as the southern slopes of Western Pamir. It is related to thermophilous fringe and shiblyak communities of the eastern and south-eastern Mediterranean areas of Europe, probably thermophilous scrub or small trees communities on deep soils reported from Crimea as e.g. *Asparago verticillati-Crataegion tauricae* and *Elytrigio nodosae-Rhuion coriariae* (Mucina et al., 2016). In southwestern Pamir-Alai, this formation is an important

landscape dominant at lower and mid-elevations. A characteristic feature is the leaf fall during the hot summer in several shrub species and drying up of the herbaceous layer. They became green again in late autumn (Zapryagaeva, 1964). Shiblyak is dominated by small trees or shrubs such as Amygdalus bucharica, Pistacia vera, Acer pentapomicum, Rhus coriaria, Ziziphus jujuba, Ficus carica, Punica granatum, Calophaca grandiflora, Paliurus spina-christi, Celtis australis subsp. caucasica and Cercis griffithii (Photo 15, 16). In the undergrowth the most frequent taxa are Artemisia baldshuanica, Poa bulbosa, Elytrigia trichophora, Hordeum bulbosum, Bromus oxyodon, Aegilops triuncialis, Bromus tectorum and many other steppe, semi-savanna and forb plants. They can thrive in shiblyak as the density of canopy is very sparse, ranging between 10 to 20% on average. The final assignment and classification of this type of vegetation in Tajikistan requires further detailed study.



Photo 15. A sparsy stands of *Pistacia vera* and *Cercis griffithii* in Darvaz Range near Nurek.



Photo 16. Spring aspect of the community of *Cercis griffithii* in the Vaksh River Valley near Bidardak.

XEROPHILOUS SHRUBS OF MONTANE AND SUBALPINE BELT

In Russian botanical literature this type of vegetation is called 'rosaria', as the *Rosa* species often dominate in these communities. In our opinion this kind of deciduous shrub with typical seasonality of development for temperate zones should be divided into two groups: mesophilous, growing on well developed brown or grey soils, and dry, typical for arid places with scarce and underdeveloped soil profile.

In Tajikistan, the first group is distinguished by abundant contribution of Rosa kokanica, R. beggeriana, R. ecae, R. fedischenkoana and R. maracandica (Photo 17). They are accompanied by other shrub or forb plants including Berberis heteropoda or B. integerrima, Cotoneaster hissaricus, C. insignis, C. nummularius, Ferula jaeschkeana, Prangos pabularia, Polygonum coriarium, Prunus spinosissima and Wikstroemia alberti. The species occupy slopes of different exposition at altitudes of 1,500–2,500 m a.s.l. on moderately humid substrates with fairly well-developed and fertile soils.



Photo 17. Xeric shrubs with Rosa ovezinnikovii on slopes of the Peter the First Range.

In arid habitats of dry screes or rock ledges, the communities of *Ephedra* spp. create a dominant type of vegetation. The most prominent are phytocoenoses of *Ephedra intermedia*, *E. glauca* and *E. equisetina* accompanied by shrubs of *Atraphaxis pyrifolia*, *A. seravschanica* and *Sageretia laetevirens* (Photo 18). Probably stands of *Juniperus shugnanica* spotted on rocky shelves and screes in Western Pamir (currently the only stands known from the Rushan Valley) belong to the same type of vegetation.



Photo 18. Xeric shrubs with fruiting *Ephedra equisetina* near Iskander-kul in Zeravshan Mts.

JUNIPER WOODS AND SCRUBS

These orotemperate, fairly dry and evergreen stands make a dominant zonal formation in subalpine belts at altitudes of 1,000 to 3,500 m a.s.l. They are composed of sparse, small juniper tree stands in the subalpine belt (so-called 'archevniki'). The community is closely related to the relict oromediterranean or orotemperate dry juniper-pine woods of south-eastern Europe or south-western Asia *Jasmino-Juniperion excelsae* reported from the Crimea or *Berberido creticae-Juniperion foetidissimae* known from Lebanon or Anatolia (Mucina et al., 2016).

In Tajikistan this type of vegetation can be divided into three altitudinal vicariants.

The thermophilous juniper woods are dominated mainly by Juniperus polycarpos var. seravschanica which is an endemic tree to Middle Asia (Photo 19). The most dense and extensive stands of seravshan juniper are noted in the Turkestan, Zeravshan, Hissar and Darvaz ranges in western Pamir-Alai at an elevation of ca. 1,000–2,500 m a.s.l. The scrub and herbaceous layers vary to a great extent depending on canopy density and habitat conditions. Among the most frequent plants contributing to this layers are cryophilous steppe and forb species such as: Elytrigia trichophora, Festuca rupicola, Prangos pabularia, Dianthus baldshuanicus and Polygonum paronychioides.



Photo 19. Stands of *Juniperus polycarpos* var. serurschanica surrounding the Allowdin Lakes in Pastrud-daria River Valley in the Zeravshan Mts.

Cryophilous juniper woods. They consist of Juniperus turkestanica and J. semiglobosa and occupy higher altitudes. In Western Pamir-Alai they form a distinct zonal belt on northern slopes at elevations of ca. 2,200–3,000 m a.s.l. A range of subassociations of Turkestan juniper wood have been defined depending on different undergrowth composition. The most frequent species contributing to herbaceous layer are Ziziphora pamiroalaica, Acantholimon velutinum, Cousinia outichaschensis, Geranium regelii, Eremogone griffithii, Dracocephalum komarovii, Poa pratensis and P. nemoralis (Zapryagaeva, 1976; Photo 20).

Chionophilous juniper shrubs. A low and sparse shrubby vegetation in the upper alpine belt built by small species of Juniperus communis var. saxatilis with



Photo 20. Stands of *Juniperus pseudosabina* on the northern slopes of Turkestan Range near Buragen.

inconsiderable admixture of *Juniperus pseudosabina* and *J. semiglobosa*. The main range of this community is in the upper alpine belt of the Eastern Tajikistanian, Western Pamirian and Turkestanian geobotanical regions.

DESERTS AND SEMI-DESERTS

Herbaceous and dwarf-shrub vegetation

The desert zone in Tajikistan includes the lowlands of the Fergana Basin, the south-western parts of Tajikistan and the cold, dry plateaus of Eastern Pamir. Geographically these areas are significantly distinct which results in vegetation variety and their species composition. However, the common feature of deserted vegetation in Pamir-Alai is its seasonality with the blooming period shifted to late summer or autumn, with short geophytic aspect in early spring. In the hottest areas in Prisyrdarian and South Tajikistanian geobotanical subregions, the semi-desert vegetation consists of herbs and dwarf-shrubs such

as: Anabasis salsa, Calligonum elegans, C. ×calcareum, C. leucocladum, C. ×paletzkianum, Carex physodes, C. subphysodes, Convolvulus divaricatus, Corispermum lehmannianum, Cutandia memphitica, Dorema sabulosum, Kochia iranica, Lagochilus gypsaceus, Peganum harmala, Psilurus incurvus, Stipagrostis karelini, Salsola aperta, S. forcipitata, S. leptoclada, S. sclerantha, Schismus arabicus and Zygophyllum ferganense that are resistant to high temperature and drought. This vegetation develops on gentle slopes or river terraces on sandy or gravelly, alkaline substrates (Photo 21).



Photo 21. Semi-desert with *Zygophyllum ferganense*, *Anabasis salsa* and *Echinops nanus* near Asht in Fergana Basin.

In the mid-elevational zones, between 1,300 and 2,600 m a.s.l. a kind of deserted steppes, with occasionally lower than 30% total plant cover and contribution of salt-resistant species occur. Depending on the phytogeographical region, the phytocoenoses with domination of *Artemisia cina*, *A. sogdiana* (Kuraminian range), *A. tenuisecta*, *Ptilagrostis caragana* (Zeravshanian and Turkestanian ranges) and others with *Kochia prostrata*, *K. scoparia*, *Nanophyton erinaceus*, *Salsola baranovii*, *S. drobovii*, *Zygophyllum miniatum* and *Z. oxianum* have been reported.

The highest locations in East Pamir harbour a range of cryoxerophytic semi-deserts; they occupy gentle slopes, sand deposits and occasionally screes at 3,500–5,000 m a.s.l. The most abundant and frequent taxa of this type of sparse vegetation are *Ajania tibetica*, *Chamaerhodos sabulosa*, *Corispermum gelidum*, *C. hilariae*, *C. pamiricum*, *C. tibeticum*, *Crepis flexuosa*, *Dracocephalum*

paulseni, Ermania crassifolia, E. flabellata, E. pamirica, Erodium tibetanum, Eurotia ceratoides, Krascheninnikovia ceratoides, Lepidium cordatum, Salsola oreophila, Saussurea faminziniana, Zygophyllum obliquum, Z. rosovii, Braya brachycarpa, B. pamirica, Elymus alaicus and E. dasystachys (Stanyukovich, 1982; Photo 22). Sometimes the arid, high-altitude steppes with Stipa glareosa, S. orientalis, Artemisia lehmanniana and A. rhodantha are included into semi-deserts.



Photo 22. Sandy semi-desert with *Astragalus dignus* and *Corispermum bilariae* in high Plateau of Eastern Pamir near Kara-kul Lake.

Semi-desert shrub vegetation

So-called 'dzhangal' is a semi-desert scrub vegetation with sclerophytic plants on sandy, deserted lands. They are dominated by species with reduced or rudimental leaves with bi-seasonal activity - in spring and autumn. The most important species that form these communities in south-western Tajikistan and in the Fergana Basin are Haloxylon ammodendron, H. persicum, Calligonum griseum, C. przewalskii., C. microcarpum, C. setosum, C. junceum, Carex physodes, Bromus tectorum, Salsola richteri, S. dendroides and S. orientalis (Sidorenko, 1953; Photo 23). In some vegetation plots Lycium ruthenicum, Calligonum elatum and Ammodendron karelinii also attain high cover. This type of vegetation needs to be thoroughly investigated and its relation to Ephedra dominated communities as well as to dry, arid steppes should be examined.



Photo 23. Shrubby 'dzhangal' vegetation with *Zygophyllum gontscharovii*, *Echinops knorringianus* and *Carex physodes* in Mogol-Tau Range near Samgar.

SALT MARSHES AND SHRUBS

The salt marsh vegetation occupies small, distinctive areas in lake shores in high altitudes in Eastern Pamir as well as in colline and foothill belts along rivers, springs and artificial leakages.

In south-western Tajikistan, the salt vegetation inhabits shallow ponds and wetlands on clayey and silty soils in valley bottoms or in the apron zone of screes and rock faces. It develops as ephemeral spring community, but often has also a second blooming time in autumn, similar to desert plant communities. This type of vegetation is closely related to the east Mediterranean salt marshes and can be included in the Fankenietalia pulverulentae order. The diagnostic taxa that occur in southern Tajikistan and in the Fergana Valley include: Aeluropus lagopoides, A. littoralis, Bassia eriophora, Bolboschoenus maritimus subsp. affini, Bunium bourgaei, Centaurium pulchellum, C. spicatum, Climacoptera bucharica, C. olgae, Cressa cretica, Crypsis schoenoides, Frankenia bucharica, F. bucharica subsp. vvedenskyi, F. pulverulenta, Gamanthus gamocarpus, Girgensohnia diptera, Halimocnemis mollissima, Halocharis hispida, Halocnemum strobilaceum, Halothamnus auriculus, Henrardia persica, Hornungia procumbens, Psylliostachys leptostachya, P. myosuroides. P. suworowii, Samolus valerandi, Sclerochloa woronowii, Sophora lehmanni, Spergularia marina, Sphenopus divaricatus, Tetracme bucharica, Tetradiclis tenella and a number of Suaeda species (Photo 24).



Photo 24. The community with domination of *Psylliostachys leptostachya* and *P. suworowii* on salt marshes near Vose in southern Tajikistan.

As a result of succession changes these herbaceous communities became a shrubby vegetation with Anabasis eriopoda, A. aphylla, A. truncata, A. turkestanica, Halostachys belangeriana, Haloxylon persicum, Kalidium caspicum, K. schrenkianum, Limonium reniforme, Salsola orientalis, S. richteri and Seidlitzia rosmarinus. They develop within the same geobotanical regions in a mosaic of semi-deserts (Photo 25) and are also in close contact with riverbed shrubs with Tamarix spp. domination.



Photo 25. The shrubs on saline soils with *Zygophyllum ferganense* and *Ephedra strobilacea* near Asht in Fergana Valley.

Significantly distinct are salt marshes at high altitudes in Eastern Pamir. Species poor, with low vegetation cover they inhabit a shoreline of alpine ponds and lakes as well as along rivers. They consist of species adapted to extremely harsh environment –

for example Limbarda salsoloides, Artemisia macrocephala, Dilophia salsa, Polygonum sibiricum var. thomsonii, Puccinellia gigantea, P. humilis, P. pamirica, Suaeda olufsenii, Taraxacum atrans and others (Photo 26).

Additionally, the salt marsh vegetation of Pamir-Alai is completed by salt meadows and mats with *Lysimachia maritima* or *Halerpestes sarmentosa*.



Photo 26. High altitude salt marshes with *Puccinellia* spp. in the Eastern Pamir.

CUSHION-TRAGACANTHIC SCRUBS

This type of vegetation reveals a strong altitudinal distinction. In the arid land of Eastern Pamir, the cushion-tragacanthic communities inhabit a gentle slopes with underdeveloped soil, often almost on barelands, screes or crests. They can be compared to Carici-Genistetalia lobelii occurring in the Mediterranean mountains, in the area of Sardinia or Corsica (Mucina et al., 2016). The communities are composed of sclerophyllous dwarf shrubs and cushion scleromorphic perennials, often accessorised with thorns. They are resistant to strong wind exposition, long winters with extremely low temperatures minima (up to -50 °C) and are able to thrive during short growing period on alkaline bedrocks with very scarce organic matter content. They can reach up to 4,500 m a.s.l. (communities with Acantholimon korolkovii, A. pamiricum or Eremogone griffithii, Gypsophila herniarioides; Photo 27). In lower elevations (ca. 1,600-2,800 m a.s.l.) the Onobrychis cornuta community finds its suitable habitat.

Although this type of cushion sparse vegetation reaches its optimum in the highest alpine belt, it



Photo 27. Slopes with *Gypsophila herniarioides* community near Murghab in the Eastern Pamir (ca. 4,500 m a.s.l.).

can also be found in montane and subalpine belts of Pamir-Alai. Here, communities of *Acantholimon tataricum*, *Astragalus lasiosemius*, *Onobrychis cornuta*, *O. echidna*, *Acantholimon diapensioides*, *A. hedinii*, *Cousinia pannosa*, *C. franchetii* and *Astracantha* spp. are the most widespread phytocoenoses (Photo 28).

The cushion-tragacanthic vegetation often has patchy physiognomy and occurs in a mosaic with cryophytic grasslands formed by *Stipa orientalis*, *S. glareosa*, *S. caucasica* and *S. turkestanica*.

In the colline belt several anthropogenic plant communities of thorny, sclerophytic species have been defined. They differ considerably in terms of species composition and phenology, having the blooming phase in late spring and summer. The most frequent and abundant species assigned to this type of sclerophytic vegetation are *Consinia fedtschenkoana*, *C. sarawschanica*, *C. splendida*, *C. stephanophora*, *C. verticillaris*, *C. bonvalotii*, *C. franchetii* and others.

The vegetation of sclerophytic cushion plants is still being investigated and little is known about its diversity and distributional patterns.



Photo 28. Community with *Consinia pannosa* on the slope of Darvaz Range above the Khoburobod Pass (ca. 3,650 m a.s.l.).

TALL FORBS

This type of thermophilous fringe and tall-herb vegetation seems to be one of the most important and distinct vegetation in the Middle Asia and Pamir-Alai. Despite the fact that plant communities on mesic habitats dominated by species representing Apiaceae family are known from other territories of the Irano-Turanian province, or even from southeastern Europe (compare Dictamno albi-Ferulagion galbaniferae from the Illyrian and Balkan regions), in montane and subalpine belts of Pamir-Alai so-called 'umbelipherniki' (plants of the Apiaceae family) are at their optimum and most diverse (Korovin, 1961, 1962; Stanyukovich, 1982). They manifest some similarities to mesic scree-pebble vegetation in lower elevations, but are more species rich and need more fertile substrates.

The phytosociological work on this vegetation is still not completed in Tajikistan, however, it is possible to mention several most prominent plant communities.

In the montane belt the lush and species rich tall forbs with *Inula verticillaris*, *Amberboa turanica*, *Astragalus retamocarpus*, *A. sieversianus*, *Asyneuma argutum* subsp. *baldshuanicum*, *Cousinia leptacantha*, *C. macilenta*, *C. ulchella*, *Eremurus candidus*, *Ferula clematidifolia*, F. vicaria, Ligusticum discolor, Paulita ovezinnikovii, *Stubendorffia aptera* and *S. orientalis* are widely distributed (Photo 29). They inhabit the slopes typical



Photo 29. The fleshy tall forbs with *Inula grandiflora* in the Darvaz Range near Dashtijum National Park.

for 'shiblyak' and deciduous forest zone, mainly in the Hissar, Darvaz and Peter the First ranges.

Higher altitudes between 1,500 and 2,500 m a.s.l. offer suitable conditions for communities with Asyneuma grandiflora, Dictamnus albus, D. tadshikorum, Eremurus aitchisonii, E. comosus, E. robustus, Exochorda racemosa, Ferula karategina, F. kokanica, F. linczevskii, F. ovina, F. samarcandica, Fritillaria eduardii, F. olgae, F. regelii, Galatella hissarica, Geranium regelii, Iris hoogiana, Lathyrus mulkak, Ligularia thomsonii, Lophanthus ouroumitanensis, Megacarpaea gigantea, Paeonia intermedia, Phlomoides lehmanniana, Prangos pabularia, Rumex pamiricus, R. paulsenianus, Senecio olgae, Vicia tenuifolia and Wikstroemia alberti (Photo 30).



Photo 30. The spectacular tall forbs with *Eremurus robustus* in Darvaz Range near Khost.

In the Eastern Pamir and at the highest elevations of the Western Pamir-Alai ranges, mostly above 3000 m, the cryophytic tall forbs are dominated by Aconogonon hissaricum, A. zaravschanicum Delphinium oreophilum, Doronicum turkestanicum, Euphorbia monocyathium, Geranium himalayense, Megacarpaea gracilis, Polygonum coriarium, P. songaricum and Rumex nepalensis (Photo 31).



Photo 31. The tall forbs with *Delphinium oreophilum*, *Lindelofia stylosa* and *Hedysarum ferganense* var. *poncinsii* in high elevation of Eastern Pamir near Alichur.

There are also azonal tall herb vegetation along rivers and streams in Tajikistan. A showy example is the community with *Heracleum lehmannianum* that creates a lush vegetation in the Hissar and Zeravshan



Photo 32. Community of Caragana jubata in the Alai Range.

ranges. A very distinct tall forb community is coined by the stands of *Caragana jubata* (Photo 32). Its relation to scrub or scree vegetation of the alpine belt is still unresolved but, due to its physiognomy, species richness, plant cover and biomass, it seems that this community should be included in forb vegetation.

Steppe vegetation

Steppes form one of the most prominent biomes in the Middle Asia thanks to the continental climate with warm and dry summers and severe, cold winters that do not support tree growth. Environmental conditions with a long pastoral tradition have brought about the extensive area in montane, subalpine and even alpine belts covered by vast steppes (Nowak et al., 2018; Werger & van Staalduinen, 2012). The steppes of Tajikistan can be divided into three main types depending on soil profile and altitude.

High-altitude arid steppes

These sparse grassy phytocoenoses occupy the highest and driest sites, at altitudes ranging from ca. 1,700-4,100 m a.s.l. The vegetation has patchy physiognomy forming loose stands dominated by graminoids and develops on vast, flat areas of cold semi-deserts. In the eastern Pamir-Alai community of Serratula procumbens-Stipa caucasica subsp. desertorum (flat sandy and gravely substrates with Serratula procumbens and Eremopyrum distans) and association of Astragalo chomutowii-Stipetum subsessiliflorae (with Ephedra regeliana, Acantholimon hedinii, Euphorbia tranzschelii, Androsace dasyphylla) were distinguished (Nowak et al., 2018). Both steppe types are species poor (mean species number per plot is ca. 9) with herb cover reaching 40%, and develop on sites with low organic matter content (Photo 33).

In western Tajikistan – mainly in the Zeravshan and Turkestan ranges – the association of *Stipetum drobovii* was reported (Nowak, Nowak, et al., 2016a). The species grows at altitudes from 1,350 to 2,250 m and forms a low, sparse steppe closely related to alpine scree phytocoenoses and semi-deserts. Apart from the dominant *Stipa drobovii* var. *drobovii*, also other alpine species contribute to the communities. They include: *Artemisia porrecta*, *A. persica*, *Stipa drobovii* var. *iskanderkulica*, *Elaeosticta hirtula*, *Ferula foetidissima*, *Phlomoides speciosa*, *Piptatherum songaricum* and *Veronica intercedens* (Photo 34).



Photo 33. The sparsy stands of *Stipa glareosa* and *S. orientalis* on gravely substrates in Eastern Pamir near Alichur.



Photo 34. Stipetum drobovii on the slope of the Fann Mts. near Iskander-kul Lake.

Dry, thermophilous steppes of montane and subalpine belt

This type of steppe vegetation develops on slopes in colline and montane belts at altitudes between 600 and 1,800 m a.s.l. They can have typical graminoid physiognomy or consist mainly of dwarf shrubs. On the southern slopes in the Fergana Valley and northern gentle slopes of the Alai range, the association of Convolvuletum spiniferi was found. This patchy, dwarfshrub steppe also includes herbaceous plants such as: Alyssum dasycarpum, Artemisia persica, Bromus lanceolatus, Eremurus sogdianus, Taeniatherum caput-medusae subsp. crinitum, Stipa drobovii var. iskanderkulica, Erysimum diffusum, Sanguisorba alpina and Lomelosia olivieri. It develops on gravelly substrates and has a total herb cover of about 30–70%.

A typical graminoid steppe is the community of Elytrigia trichophora-Linum corymbulosum. It is a thermophilous vegetation growing on gentle slopes at altitudes of 1,600-2,500 m a.s.l. preferring substrates with a well-developed organic soil layer and scarce amount of gravel debris. The most important species of this steppe are Achillea arabica, Alyssum dasycarpum, Bromus oxyodon, Bothriochloa ischaemum, Centaurea besseriana, Diarthron vesiculosum, Elaeosticta hirtula, Eremurus tianschanicus, Velezia rigida and Ziziphora interrupta.

At the same altitudes the association of *Stipo magnificae-Otostegietum olgae* grows on hillsides and escarpments with considerable inclination of ca. 20–50° (Photo 35). The substrate is loamy, deep, often of a reddish colour with scarce content of organic matter. Despite the diagnostic species, the most prominent contributors of this association are *Aegilops triuncialis*, *A. cylindrica*, *Artemisia kochiiformis*, *Bromus danthoniae*, *Carthamus lanatus*, *Elymus cognatus*, *Haplophyllum ferganicum*, *Silene brahuica*, *Stipa hohenackerana*, *S. arabica* and *Ziziphora tenuior*. This is one of the riches steppe community in Pamir-Alai, sometimes having more than 35 species in a particular plot.

On northern and western slopes of the Hissar, Zeravshan and Turkestan Mts. (western Pamir-Alai), the association of *Stipetum lipskyi* was noted at elevations of ca. 1,100–1,650 m a.s.l. (Photo 36). It consists of *Aphanopleura capillifolia*, *Artemisia persica*, *Boissiera squarrosa*, *Chardinia orientalis*, *Eremopyrum bonaepartis*, *Poa bulbosa*, *Stipa hohenackeriana*, *Taeniatherum caput-medusae* subsp. *crinitum*, *Vulpia persica*, *Ziziphora tenuior* and develops on slopes with a considerable



Photo 35. Stipo magnificae-Otostegietum olgae growing on hillsides in the eastern part of the Fergana Valley.

amount of organic soil content with very insignificant gravel debris amount (Nowak, Nowak, et al., 2016a).

Mountain steppes of semi-arid areas

This type of steppe vegetation occupies flat and wide valleys located at high altitudes in northern Pamir-Alai. In the alpine belt of the Alai Valley, the association of *Littledaleo alaicae-Stipetum trichoidis* inhabits vast



Photo 36. Stipetum lipskyi on northern slopes of the Zeravshan Mts. near Veshan.

terraces of rivers. It has a typical physiognomy of 'grassy' steppe with total cover of 60–90% and is built mainly by Artemisia sieversiana, Astragalus kokandensis, Carex turkestanica, Festuca rupicola, Galium tianschanicum, Leymus secalinus, Seriphidium skorniakovii, Stipa arabica, S. glareosa, S. krylovii and Stipa turkestanica subsp. trichoides (Photo 37).



Photo 37. The association of *Littledaleo alaicae-Stipetum trichoidis* in the Alai Valley.

Another steppe association able to withstand the harsh environmental conditions is *Helictotricho fedtschenkoi-Stipetum kirghisori*. It occupies slightly more fertile sites and reaches higher total plant cover. The association plots were found at slightly lower altitudes of 2,300–3,500 m a.s.l. in the eastern Alai Mts. The plots of *Helictotricho fedtschenkoi-Stipetum kirghisori* are moderately rich in species with alpine and scree plants including *Artemisia rutifolia*, *Astragalus nivalis*, *Dracocephalum komarovii*, *Potentilla bifurca* var. *humilior*, *P. hololeuca*, *Stipa caucasica* and *Poa relaxa* as the most frequent.

In western Pamir-Alai, in high montane and alpine belts of the Zeravshan Mts., phytocoenoses of *Stipetum jagnobicae* occupy the gentle slopes with firm, stable surfaces at altitudes between 1,730 and 2,450

m a.s.l. *Stipetum jagnobicae* has the total cover of the herb layer between 50 and 85% and is moderately species rich (ca. 20 taxa per plot). The most important are *Astragalus sarytavicus*, *Ceratocephala testiculata* and *Rochelia cardiosepala*.

Stipetum margellanicae known from the Peter the First, Turkestan and Ak-tau Mts., is a plant association closely related to tall-herb vegetation. This steppe develops on gentle slopes of wide valleys on stable ground fully covered by organic soil layer at altitudes from 2,000 to 2,260 m a.s.l. It is formed by Allium barsczewskii, Astragalus krauseanus, A. mucidus, Carex stenophylla subsp. stenophylloides, C. turkestanica, Centaurea besseriana, Crepis trichocephala, Erysimum diffusum, Poa bulbosa and S. capillata.

Additionally, in the Pamir-Alai a number of steppe communities with domination of *Artemisia* species occur. They considerably differ depending on altitude, geographical range and organic matter content in the soil profile. The preliminary studies of mugwort steppes reveal distinct communities of *Artemisia baldshuanica*, *A. ferganensis* and *A. turanica* in the colline belt, *Artemisia glanduligera* and *A. prolixa* in the montane belt and *Artemisia korovinii*, *Seriphidium korshinskyi* and *S. skorniakovii* in the high alpine belt (Photo 38).



Photo 38. Mugwort steppe dominated by *Artemisia ferganensis* in the colline belt of Fergana Range.

Russian authors (e.g. Ovchinnikov, 1957; Stanyukovich, 1982) define a distinct type of vegetation named 'timianniki'. It includes plant communities dominated by representatives of the Lamiaceae family (e.g. Hyssopus seravschanicus, Moluccella spp., Origanum tyttanthum, Perovskia spp., Salvia spp., Ziziphora spp.). In our opinion it is a kind of thermophilous or montane genuine steppe. Probably they are closer to similar steppe meadows of Galietalia veri known from the forest-steppe zone of southern Siberia (Mirkin & Naumova, 2012).

PSEUDOSTEPPES

Colline and lowland pseudosteppes

This type of vegetation was recently defined in Tajikistan as thermo-mesomediterranean secondary perennial pseudosteppes on deep calcareous soils of colline and montane belts in mediterranean-like climates (including Irano-Turanian) with a long dry summer period (Świerszcz et al., 2020). They extend mainly in south-western Pamir-Alai and in the northern slopes of the Fergana Valley. They are characterised by high total plant cover (ca. 80–90%) and have a blooming peak early in spring (April–May; Photo 39). Then, they almost disappear during the



Photo 39. Meadow with *Koelpinia macrantha* near Panj in southern Tajikistan.

very hot summer and are subsequently grazed again in autumn – almost to the bare ground in some years. These vegetation grows mainly on loessic or organic, fertile soil with calcareous bedrock, where the terminal stage of vegetation is shrubland. In the Middle Asia it occurs in the western foothills of Pamir-Alai, the Fergana Valley and the western slopes of the Tian-Shan Mts. The most prominent species that has formed this type of grasslands are Hordeum bulbosum, Cynodon dactylon, Taeniatherum caput-medusae subsp. crinitum, Avena sterilis subsp. ludoviciana, Carex pachystylis, Vulpia persica, Poa bulbosa, Brachypodium distachyon, Aegilops tauschii, Bromus sterilis, Lolium persicum, Dactylis glomerata, Plantago lanceolata, Bothriochloa ischaemum and Astragalus retamocarpus.

In some patches Medicago species (e.g. Medicago rigidula, M. minima), or Aphanopleura capillifolia, Eremurus bucharicus, E. suworowii and Bunium persicum dominate. To date, a number of pseudostepe types have been distinguished, among others Eremuretum bucharicae, Hordeo bulbosi-Astragaletum retamocarpi, Potentillo orientalis-Eremuretum fuscae, Achnathero caraganae-Delphinietum semibarbati and Eremuro tianschanicae-Delphinietum biternatae (Świerszcz et al., 2020; Photos 40-43). The species richness of these communities can be high, reaching on average ca. 40 species per plot. In the northern and north-eastern slopes of the Fergana Valley, the species richness of pseudosteppe phytocoenoses is slightly smaller. The dominant



Photo 40. Pseudosteppe with *Eremurus albertii* near Vose in southern Tajikistan.



Photo 41. Pseudosteppe with *Eremurus suworowii* on slopes of Ak-Tau Range in southern Tajikistan.



Photo 42. The community of *Eremurus korshinskyi* in the Western Pamir near Khuf.



Photo 43. The *Eremuro tianschanicae-Delphinietum biternatae* on the southern slopes of Kyrgyz range near Toktogul.

species are more or less the same, however, the species composition reveals the dryer and more continental conditions as the more frequent plants include: Arenaria serpyllifolia, Festuca valesiaca, Carex turkestanica, Galium pamiroalaicum, Centaurea pulchella, Erigeron petroiketes, Festuca pratensis and Kalimeris altaica.

Additionally, another type of pseudosteppe was distinguished for more disturbed habitats. It is called Circum-Mediterranean calciphilous annual and ephemeroid grassland with a considerable contribution of annuals. In Tajikistan it is represented by Cryptosporo falcatae-Brachypodietum distachyi. This association occupies the warmest habitats in Tajikistan, however at a slightly higher elevation, mainly in montane belt. Since it occurs on steep slopes, the plant cover is low, and the bare land can be easily inhabited by annuals. The main contributors to the vegetation patches are Aphanopleura capillifolia, Aristida adscensionis, Arnebia coerulea, Bromus lanceolatus, Bromus oxyodon, B. tectorum, Cryptospora falcata, Galium nupercreatum, Hypogomphia bucharica, Koelpinia linearis, Vulpia persica and many others. This community is used as moderately grazed pasture for sheep and goats (Photo 44).



Photo 44. Cryptosporo falcatae-Brachypodietum distachyi on the slopes of Babatag Mts. near Obi-kiik.

Pseudosteppes are an important habitat for decorative tulips such as: *Tulipa hissarica*, *T. kaufmanniana*, *T. linifolia*, *T. maximoviczii*, *T. praestans*, *T. subpraestans* and others.

MEADOWS AND PASTURES

The mesophilous grasslands are one of the most prominent vegetation type in Tajikistan, extending along all the ranges and creating a distinct phytocoenoses from colline to alpine belt. They are still being investigated and require further detailed studies to uncover their diversity and distribution patterns. However, preliminary studies on meadow-like phytocoenoses in south-western Tajikistan reveal their extreme richness in species composition (up to 80 species per plot); this is due to a large species pool and extensive management with mixed pastoral-mowing scheme. At the other site, in Eastern Pamir, the highly elevated matts and swards reveal extremely species poor composition.

Alpine swards and pastures

The alpine belt stretching approximately between 2,700 and 4,000 m a.s.l. offers a suitable condition for grassland formation as the precipitation amount is suitably distributed across the year and relatively high (ca. 600–1,000 mm annually). It is difficult to distinguish the main meadow and pasture types of this zone without a detailed study. Inevitably they occur as a complex patchy mosaic and depend on

microhabitat patterns and temporary change of management conducted by local people (Afanasjev, 1956; Sidorenko, 1971).

The alpine swards consists of a number of species, including Achillea bucharica, Aconitum rotundifolium, Agrostis canina, Anemone narcissiflora subsp. protracta, Aster alpinus vax. serpentimontanus, Calamagrostis alajica, Eritrichium villosum, Gagea jaeschkei, G. leucantha, G. olgae, G. setifolia, Hedysarum cisdarvasicum, Lagotis ikonnikovii, Linum olgae, Lloydia serotina, Myosotis alpestris, Paeonia intermedia, Pedicularis sarawschanica, Pedicularis verae, Polygala comosa, Pulsatilla campanella, Silene uralensis subsp. petala and Tulipa turkestanica (Photos 45, 46).



Photo 45. The alpine sward with *Gentiana algida* in the Eastern Pamir near Kara-kul Lake.



Photo 46. The alpine pasture with *Crocus korolkovii* in Varzob River Valley in Hissar Mts.

In the Hissar-Darvaz Mts. a very distinct phytocoenosis is built by *Potentilla flabellata* and *P. crantzii*. Patches of this phytocoenosis are sporadically mown or grazed. As far as life spectrum and species composition is considered, some of these patches resemble the species-rich alpine rarely mown and extensively grazed swards from *Onobrychido-Seslerietalia* order that is known from southern Europe.

The typical alpine pastures in Pamir-Alai are dominated by Adonis turkestanica, Alopecurus mucronatus, Carex borii, Cerastium falcatum, Cirsium acaule, Crepis multicaulis, C. oreades, Deschampsia koelerioides, Gagea minutissima, Geum kokanicum, Inula rhizocephala, Lagotis korolkowii, Ligularia alpigena, L. heterophylla, L. narynensis, Lindelofia olgae, Persicaria vivipara, Poa albertii subsp. albertii, P. alpina, P. tianschanica, P. tibetica, Polygonum turkestanicum, Sibbaldianthe bifurca subsp. orientalis, Taraxacum atrans, T. badachschanicum, T. behzudicum, T. brevirostre, T. karakoricum, T. leucanthum, T. luridum, T. minutilobum, T. schugnanicum, Tripleurospermum disciforme and Viola tianschanica. They are grazed in the summer period with different intensity depending on the distance from the human settlements and altitude (Photos 47-51).



Photo 47. Pastures with Ranunculus alajensis in the alpine belt of the Hissar Mts.

At high altitudes, there are also a distinct and species poor mats with domination of *Kobresia capillifolia*, *K. humilis*, *K. royleana* and *K. schoenoides*, representing in the subnival and alpine belt of Pamir-Alai wind-exposed low grasslands on base-rich substrates



Photo 48. Alpine pasture with *Ligularia heterophylla* in the Pastrud River Valley (in the Zeravshan Mts).



Photo 51. The alpine pasture with *Lagotis korolkovii* in Takob Valley in Hissar Mts.



Photo 49. Alpine pasture with domination of *Adonis turkestanica* in Fann Mts. near Sarytog.



Photo 50. The pasture with Carum carvi in the Zeravshan Mts.



Photo 52. *Kobresia capillifolia* – component of heavily grazed pastures in high elevations of the Eastern Pamir.

(Photos 52, 53). They are similar to those representing Oxytropido-Elynetalia order and the most closely related to Kobresion capilliformis reported from the Caucasus (a chionophobous summit graminoid mountain tundra of the highest altitudes). In Tajikistan, the extensively grazed Kobresia mats occur in Eastern Pamir but also in the highest, subnival zones of Western Pamir-Alai.

Additionally, in lower elevations of the Turkestan and Hissar Mts. one can distinguish some boggy meadows that share numerous species with fens and tall-herb vegetation. Their plots are often dominated by *Thermopsis dolichocarpa* or *Geranium collinum*.



Photo 53. Overgrazed pastures in the northern Alai foothills.

SUBNIVAL VEGETATION

cryophytic vegetation of the harshest environments (so-called 'pustosha' and cryophyton) climb up to the highest summits of the Eastern Pamir up to 5,600 m a.s.l. The environmental conditions here are very unsuitable for vegetation; however, more than 250 vascular plants species (e.g. Aphragmus oxycarpus or Nepeta longibracteata), have been reported from the subnival belt that ranges between 4,400 to 5,600 m a.s.l. These unfamiliar habitats are characterised not only by extremely high temperature amplitudes and lowest minimum temperature in winter up to -60 °C, but also by high solar radiation – and particularly UV-B radiation - that can be more than 100% more intense than in the valleys (see Leuschner & Ellenberg, 2017). Moreover, the daily frost even in summer, the scarce soils and nutrient availability combined with solifluction, longlasting and deep snow cover, slabs, avalanches in some land formation and strong winds make this area one of the most unfavourable for plant life.

One of the most distinctive vegetation types of the highest elevations in Tajikistan are the snow-bed mats and patchy alpine swards that can be compared to Hyalopoion ponticae known from the Caucasus (the Salicetea herbaceae class). There is no detailed division into calcicole and calcifuge communities for Pamir Mts., however, inevitably several types of subnival patchy swards or mats were found. The most important components of this vegetation are Astragalus heterodontus, Dracocephalum paulsenii, Erigeron heterochaeta, Lagotis decumbens, L. globosa, Leontopodium fedtschenkoanum, L. nanum, Oxytropis humifusa, O. immersa, O. leucocyanea, O. michelsonii, O. savellanica, Pedicularis amoeniflora, P. dubia, Saussurea caprifolia, S. gilesii Scrophularia incisa and Smelowskia calycina (Photo 54).



Photo 54. The alpine meadows with Nepeta pamirensis and Oxytropis savellanica in the upper sections of the Ghunt Valley near Jelandi.

They develop on slopes or mountain tops with some organic matter cover, fairly humid soil profile and snow cover that persists for several months.

In more arid places with no or very short snow cover, gravelly or even scree substrate communities of chionophobus habitats develop. They are species poor with a short blooming period, as is also the

Photo 55. Community of *Nepeta longibracteata* and *Erigeron* sp. in Akbaytal Pass in the Eastern Pamir (ca. 4,700 m a.s.l.).

whole vegetation season lasting from late June to early September. The most prominent species of these communities are Acantholimon diapensioides, Astragalus alitschuri, A. djilgensis, A. nivalis, A. pamirensis, Chorispora songarica, Hedysarum ferganense var. poncinsii, Oxytropis immersa, O. trichosphaera, O. vermicularis, Saussurea kuschakeviczii and Sisymbriopsis mollipila.

There is also typical snow-bed and moraine vegetation that develops in unstable, often destroyed sites close to glacier fringes or on the northern exposition with snow cover lasting for almost the whole year. They are extremely species poor with 2–5 taxa per plot. The most frequent contributors of this vegetation are *Saussurea glacialis*, *S. gnaphalodes*, *Desideria himalayensis* and *D. pamirica*.

Under the rock faces, in wide rock ledges or crevices with some soil content, the rudimental subnival communities typical of rupiculous habitats are noted. They consist of plants such as: Nepeta longibracteata, Euphorbia kanaorica, Acantholimon tianschanicum, Corydalis inconspicua, Erigeron brachyspermus, Leiospora pamirica and Sibbaldia tetrandra (Photo 55).

FENS AND SPRINGS

Fen communities

The mountainous fens of Tajikistan are moderately rich in species and dominated by sedges, some grasses as well as dicots representing the Dactylorhiza spp., Primula spp., Euphrasia spp. and Gentiana spp. genera. The most widespread fen association in the studied area is Eleocharido quinqueflorae-Primuletum iljinski found in the alpine and subalpine belts of western Pamir-Alai. The association has been recorded frequently in the Zeravshan, Darvaz, Funn, Peter the First, Hissar and Turkestan Mts. at altitudes from 1,500 to 3,100 m a.s.l. Diagnostic species of this vegetation are Eleocharis quinqueflora, Parnassia laxmannii and Primula iljinskii. Additionally, frequent co-occurring plants are Blysmus compressus, Carex orbicularis, Dactylorhiza umbrosa, Euphrasia pectinata, Geranium collinum, Palustriella decipiens and Trifolium repens. The mosses are not abundant in the community. They have the average cover of ca. 15% per plot (Nowak, Nobis, et al., 2016; Photo 56).

Species poor acidophilous fens with *Allium* fedtschenkoanum have been reported from gentle slopes or from the flat areas at much higher



Photo 56. The *Eleocharido quinqueflorae-Primuletum iljinskii* in the Fann Mts. near Sarytog.

elevations (i.e. in the alpine belt, ca. 2,500 to 3,200 m a.s.l.) in Zeravshan, Hissar and Darvaz ranges. The most frequent and abundant species that contribute to this community are also: Blysmus compressus, Bryum pseudotriquetrum, Carex orbicularis, Kobresia humilis, Philonotis calcarea, Pedicularis peduncularis, Phleum alpinum, Ranunculus alajensis and Trifolium repens (Photo 57).

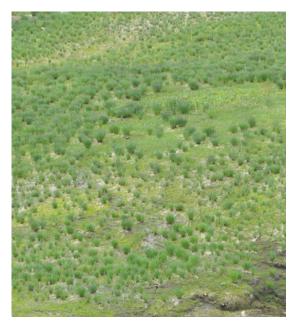


Photo 57. The community with domination of *Allium fedtschenkoanum* at Khoburobod Pass in Darvaz Range.

In the eastern Pamir-Alai, the most broadly distributed fen type is a low mat of *Carex pseudofoetida* (Photo 58). It occupies the highest elevations in the Zeravshan, Hissar and Darvaz Mts. and fairly often occurs in Pamirian ranges within the altitude between 2,500 and 4,200 m a.s.l. *Caricetum pseudofoetidae* was found on flat fen lawns on neutral, peaty, thin substrate layer with a scarce amount of mosses. The diagnostic species are *Alopecurus pratensis*, *Cerastium pusillum*, *Juncus inflexus* subsp. *brachytepalus*, *Leontopodium ochroleucum*, *Potentilla tephroleuca*, *P. pamiroalaica* and *P. crantzii*.



Photo 58. The community with domination of Saxifraga birculus and Carex pseudofoetida in the mires of the Eastern Pamir near Alichur.

The only shrubby fen association known from Pamir-Alai is Salicetum schugnanicae, which occurs in the alpine belt of western Pamir-Alai at altitudes between 2,500 and 2,900 m a.s.l (Photo 59). The association patches are comparable to vegetation with Salix lapponum in Europe. Salicetum schugnanicae grows in gently sloping fen vegetation with seeping ground water and peaty, neutral soils. The most abundant species of the association are Brachythecium mildeanum, Calliergonella cuspidata, Carex orbicularis, Equisetum arvense, Dactylorhiza umbrosa and Swertia juzepczukii.

Additionally, in the Eastern Pamir, a range of communities that still need a classification were reported. Examples are communities with *Allium atrosanguineum*, *Trollius dschungaricus*, *Primula nivalis* var.



Photo 59. Salicetum schugnanicae in Dzhidzhikrut Valley in the Hissar Mts

farinosa, P. pamirica, Pedicularis rhinanthoides, Viola altaica and Oxytropis lehmanni. Moreover, shrubby fens of Salix coesia and Aconitum leucostomum-Caragana aurantiaca were identified (Photo 60).



Photo 60. The mire vegetation with *Primula pamirica* in the Eastern Pamir.

Spring communities

In the montane to alpine belts, the most frequent spring community that occurs in close contact with tall herb vegetation is *Codonopsideto clematidi-Cortusetum turkestanicae*. Its patches were noted at altitudes ranging from 2,100 to 3,400 m in the Zeravshan, Hissar and Turkestan ranges (Photo 61). It forms a flush vegetation on side water outflows, sometimes through the stony scree with cobble materials. The plots are dominated by vascular species that reach up to 85%. The most prominent plants of this association include *Aquilegia vicaria*, *Cardamine densiflora*, *Epilobium hirsutum*, *Heracleum lehmannianum*, *Hygroambhystegium tenax*, *Mentha longifolia var. asiatica* and *Palustriella decipiens*.



Photo 61. The spring community with *Cortusa matthioli* subsp. *turkestanica* in the Kara-kum Valley in the Fann Mts.

Much richer in mosses is the association of Epilobio tianschanici-Bryetum schleicheri, occurring exclusively in crenic, alkaline waters, and sometimes runs down along the upper section of brooks and rivulets. The plots are characterised by a moderate herb cover (ca. 60% per plot). The typical species found in the community are: Agrostis gigantea, Bryum pseudotriquetrum, Equisetum arvense, Festuca rubra, Mentha longifolia var. asiatica, Veronica beccabunga and Scrophularia umbrosa (Nowak, Nobis, et al., 2016).

A kind of a verge community along brooks and small rivulets in the alpine belt is *Clementsietum semenovii*. Regarding the spring vegetation in the eastern Pamir-Alai that were identified recently, communities of *Trollius liliacinus-Schultzia crinita* and Ranunculus kamchaticus should be mentioned.

LITTORAL AND AQUATIC VEGETATION

The area of Tajikistan with its alpine orography, ridges and fast-flowing rivers is not particularly suitable for littoral communities. However, as human activity has created a number of artificial dams, reservoirs and paddy fields in the valley bottoms, littoral vegetation is represented by a number of plant communities. In the last decade about 30 plant communities have been identified in the foothills of Pamir-Alai, mainly within the Syr Darya, Pyandzh, Zeravshan, Kafirnighan, Khanaka and Surkhandaria River Valleys. Seven littoral plant association, i.e.: Scirpetum hippolytii, Mentho asiaticae-Nasturtietum microphyllae, Juncetum Sparganietum stoloniferi, Eleocharitetum brachytepali, argyrolepis, Eleocharitetum mitracarpae, Caricetum songaricae and Rorippo palustris-Alismatetum graminei are reported as unique from this area (Nowak, Nowak, & Nobis, 2014; Photo 62).

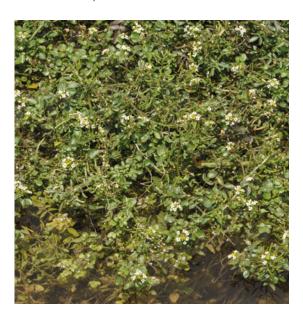


Photo 62. Low littoral stand with domination of *Nasturtium microphyllum* in Zeravshan River Valley near Sudzhina.

There is no comprehensive study on aquatic communities occurring at higher elevations of the Pamir-Alai. The association of *Stuckenia amblyphylla* was described from the alpine belt of the Zeravshan Mts. (Nowak & Nobis, 2012). In the Alichur River (eastern Pamir), a community of *Stuckenia pamirica* was noted. Additionally, a number of aquatic communities were reported in rice paddy fields. The *Potametea* class is represented by *Najadetum graminae*, *Potametum pusilli*, *Parvopotamo-Zannichellietum pedicellatae*, *Zannichellietum palustris* and *Potametum denso-nodosi* associations. While *Lemno minoris-Salvinion natantis* alliance and *Ceratophyllo-Azolletum filiculoidis* association represent the *Lemnetea* class (Nowak S., et al., 2013a; Photos 63, 64).



Photo 63. The association of *Stuckenia amhlyphylla* in the alpine brook in the Zeravshan Mts.



Photo 64. Potametum graminei in the alpine ponds of the Trans-Alai Range.

Of particular interest are the plant communities that almost exclusively inhabit muddy fields of rice; they are included in *Oryzetea sativae* vegetation. In Pamir-Alai, *Ammanietum auriculato-multiflorae*, *Bolboschoenetum planiculmis*, *Typho angustifoliae-Scirpetum mucronati* and *Sagittarietum trifoliae* have been identified (Nowak, Nowak, & Nobis, 2014; Photo 65).



Photo 65. The association of *Schoenoplectiella mucronata* in the paddy fields near Hissor.

Vegetation of summer therophytes develops in the surroundings of artificial water bodies and also on paddy fields. To date, *Symphyotricho graminifolii-Chenopodietum rubri* and the community of *Bidens frondosa* are known.

CHASMOPHYTIC VEGETATION

With more than 1,500 plant species the vegetation of rocks and screes is the most diverse in Tajikistan. It is also the most unique one, as ca. 70% of all endemic species contribute to this type of vegetation (Nowak, Nowak, et al., 2011). The richness observed in the rock vegetation is related to habitat heterogeneity, particularly long altitudinal gradient, variable geological substrates and extremely diversified orography and relief of Pamir-Alai and Tian-Shan Mts.

Vegetation of solid rock faces and fissures

The phytocoenoses found in tiny fissures and on solid faces in higher altitudes (alpine and subnival) inhabit different geological substrates, such as limestone, dolomite, marble, granite, syenite, schist and gneiss; sometimes they also develop on rock ledges, coarse cracks and friable rocks. Recently, several associations typical for this habitat have been distinguished, e.g. Sergietum regelii, Scutellarietum megalodontae, Scutellarietum rubromaculatae, Scutellarietum orbicularis, Campanuletum lehmannianae, Violetum majchurensis, Achoriphragmetum darvazici, Achoriphragmetum turkestanici, Asperuletum fedtschenkoi, Andrachnetum fedtschenkoi, Eritrichietum turkestanici, Minuartio litwinowii-Phaeonychietum surculosi, Silenetum kuhistanicae and Silenetum samarcandensis (Nowak, Nowak, Nobis, et al., 2014b; Photo 66). Additionally, the preliminary studies in eastern Tajikistan reveal further well-defined communities, e.g.: Corydalis bucharica-Hippolytia schugnanica, Inula schmalhausenii-Inula schischkinii, Draba darwasica, Fumariola turkestanica-Nepeta subhastata and Psychrogeton andryaloides.

In montane and colline belts, additional eight associations have been distinguished, i.e.: Scutellarietum hissaricae, Scutellarietum schugnanicae, Scutellarietum zaprjagaevii, Scutellarietum baldshuanicae, Tylospermetum lignosae, Dionysietum involucratae, Nanorrhinetum ramosissimi, Campanuletum albertii and the community of Scutellaria adenostegia have been distinguished. Besides the diag-



Photo 66. A diverse chasmophytic vegetation with *Dionysia involucrata* (a), *Tylosperma lignosa* (b), *Inula glauca* (c), *Dracocephalum imberbe* (d), *Dasiphora dryadanthoides* (e), *Scutellaria zaprjagaevii* (f) and *S. megalodonta* (g) developed on rocks in the Hissar and Zeravshan Mts.

nostic species, numerous other chasmophytes contribute to these phytocoenoses. The most frequent include *Campanula incanescens*, *Carex koshevnikovii*, *Poa relaxa*, *Parietaria judaica*, *Galium verticillatum*, *Syntrichia ruralis*, *Grimmia pulvinata* and *Bryum argenteum*.

Vegetation of rock clefts and ledges

Rock ledges and coarse crevices have a considerable amount of soil sediment, thus the relatively high nutrient content. These trophic conditions differentiate this habitat from the more arid tiny fissures and solid faces. As a result of resent field research, seven chasmophytic associations have been distinguished in western Tajikistan: Achoriphragmetum pinnatifidi, Asperulo albiflorae-Stipetum zeravshanicae, Inuletum glaucae, Paraquilegietum anemonoidis, Pentanemetum albertoregeliae, Rhinactinidietum popovii and Saussureaetum ovatae (Nowak, Nowak, Nobis, et al., 2014a). Communities

of Allium oschaninii, Cephalopodum badachshanicum, Dracocephalum imberbe, Crepidifolium tenuifolium and Rubia tibetica have been documented on ledges or large clefts in the Pamir.

On rock ledges and shelves a chasmophytic dwarf-shrub vegetation was also found. The example communities include *Spiraeetum baldschuanicae*, *Rhamnetum coriaceae*, *Pentaphylloidetum parvifoliae* (western Pamir-Alai) and *Pentaphylloidetum dryadanthoidis* (eastern Pamir-Alai) associations. Additionally, the community of *Ephedra glauca* and community of *Rhamnus minuta* were identified.

Fern-dominated communities

On permanently moist and often shadowed overhangings and in deep crevices, fern vegetation dominates. Recently, *Cryptogrammetum stelleri* and *Soncho transcaspici-Adiantetum capilli-veneris* were described

(Photo 67). On dry rocks of western Pamir-Alai, another fern-dominated communities are recorded. These include: *Asplenio-Ceterachetum officinarum*, *Asplenio-Cystopteridetum fragilis*, *Asplenietum trichomanorutae-murariae* and *Cheilanthetum persicae* (Nowak, Nowak, et al., 2015).



Photo 67. Soncho transcaspici-Adiantetum capilli-veneris in shadow and wet rock niche in western Pamir near Qualay-khum.

Scree vegetation

In high montane and alpine belts on gravel, pebble, cobble and rock block slides and screes, nine associations, i.e. *Anaphallidetum zeravschanicae*,



Photo 68. Angelicetum ternatae on screes in the Gorna Matcha Valley in the Zeravshan Mts.

Angelicetum ternatae (Photo 68), Feruletum foetidissimae, Feruletum koso-polianskyi (Photo 70), Feruletum sumbuli, Feruletum tenuisectae, Hedysaretum flavescentis, Stellarietum turkestanicae and Tetrataenietum olgae (Photo 69), as well as one subassociation, Feruletum foetidissimae mediasietosum macrophyllae were distinguished (Nowak, Nowak, et al., 2016b).



Photo 69. Tetrataenietum olgae in Iskander Darya River Valley near Sarytog.

Fairly rich in species and diverse is also the scree vegetation of the montane and colline belts in the Pamir-Alai. Eight phytocoenoses i.e. Cousinietum corymbosae, Eremostachyetum tadschikistanicae, Cousinietum refractae, Caccinietum dubiae, Eremuretum sogdiani, Feruletum kuhistanicae, Zygophylletum atriplicoidis and Corydalidetum kashgaricae have been recently described.

The classification of chasmophytic vegetation requires further study. In the last few years a number of communities have been identified in the eastern Pamir. The main contributors to these communities are Parrya schugnana, P. turkestanica, Waldheimia glabra, Eritrichium subjacquemontii, Potentilla agrimonioides, Allium tianschanicum, Lonicera pamirica and Corydalis gortschakovii.







Photo 70. A diverse scree vegetation with *Eremurus turkestanicus* (a), *Ferula koso-poljanskyi* (b) and *Ferula grigoriewii* (c).

SEGETAL VEGETATION

Tajikistan is a highly agrarian country with its rural population at more than 70%. Because of the mountainous landscape, only 28% of Tajik territory (14.3 million ha) is agricultural land. Of that ca. 21% (4.1 million ha) is arable land, 3% is under perennial crops (orchards and vineyards), and 76% is pasture and hay meadows. Cotton and wheat are the two main cash crops in Tajikistan, cultivated on nearly 70% of the cropped area. Of this, 36% is under wheat, 12%

barley, 5% rye, 3% oat, 3% maize and 1% sorghum (Statistical Committee, 2006).

Segetal vegetation is relatively rich in species. In one plot up to 60 species were noted in the colline belt. Depending on altitude and soil fertility, four segetal associations were distinguished: Eremodauco lehmannii-Lagonychietum farcti (the most thermophilous) Vicietum hyrcanico-peregrinae (with patches located within colline and montane belts), Asperugo-Cannabietum ruderalis (colline to alpine belts) and Lathyretum sativi (subalpine and alpine belts) (Nowak S., et. al., 2013b). The most frequent species that contribute to these phytocoenoses are Convolvulus arvensis, Chenopodium album, Galium spurium, Polygonum aviculare, Capsella bursapastoris, Roemeria refracta, Vaccaria hispanica, Lamium amplexicaule, Lepyrodiclis holosteoides, Scandix pecten-veneris, Veronica arguteserrata and Turgenia latifolia (Photo 71).



Photo 71. Extensively cultivated arable fields in the Pamir-Alai Mts.

Root crops vegetation in Tajikistan is represented by seven associations: Convolvulo arvensis-Cyperetum rotundi, Daturo stramonii-Hibiscetum trioni, Setario pumilae-Sorghetum halepensi, Galinsogo-Setarietum, Equiseto arvensi-Xanthietum italici, Portulacetum oleracei and Brassico campestris-Lamietum amplexicauli (Nowak & Nowak, 2013).

THE ENDEMISM OF FLORA IN TAJIKISTAN

Tajikistan is located in the boundary zone of phytogeographical regions. It has exceptionally variable orography and land relief with a great range of altitudinal belts. All these promote a high rate of endemism. Out of ca. 4,300 vascular plants naturally occurring in Tajikistan, about 1,400 species (ca. 35% of the flora) are endemics (*sensu stricto* and subendemics) (Nowak, Nowak, et al., 2011; Nowak & Nobis, 2010). These numbers are comparable with data from the literature for mountainous areas with a Mediterranean climate Médail & Verlaque, 1997) as

Table 3. Endemic species richness within particular family (after Nowak, Nowak, et al., 2011, supplemented).

Family	Number of endemics	%	Family	Number of endemics	%	
Fabaceae	297	53.4	Convolvulaceae	4	20.0	
Asteraceae	250	36.0	Gentianaceae	4	12.5	
Lamiaceae	98	49.2	Rhamnaceae	4	50.0	
Apiaceae	77	43.8	Ephedraceae	3	26.3	
Liliaceae	74	62.7	Onagraceae	3	16.7	
Brassicaceae	73	29.1	Orobanchaceae	3	11.5	
Caryophyllaceae	69	45.1	Papaveraceae	3	20.0	
Poaceae	68	22.4	Rutaceae	3	18.8	
Rosaceae	46	30.5	Zygophyllaceae	2	16.7	
Boraginaceae	43	35.4	Capparaceae	2	33.3	
Amarylidaceae	43	51.7	Caprifoliaceae	2	11.8	
Ranunculaceae	43	38.4	Linaceae	2	28.6	
Scrophulariaceae	32	30.2	Santalaceae	2	66.7	
Chenopodiaceae	27	20.5	Aceraceae	1	20.0	
Limoniaceae	27	58.7	Araceae	1	33.3	
Rubiaceae	24	41.4	Asclepiadaceae	1	33.3	
Polygonaceae	21	21.4	Balsaminaceae	1	33.3	
Iridaceae	17	82.1	Cornaceae	1	33.3	
Betulaceae	15	83.3	Cucurbitaceae	1	6.7	
Primulaceae	13	32.5	Cupressaceae	1	10.0	
Euphorbiaceae	12	30.8	Dryopteridaceae	1	20.0	
Campanulaceae	11	55.0	Eleagnaceae	1	25.0	
Fumariaceae	10	58.8	Geraniaceae	1	5.0	
Crassulaceae	9	31.0	Ophioglossaceae	1	50.0	
Valerianaceae	8	28.6	Polypodiaceae	1	11.1	
Violaceae	7	46.7	Potamogetonaceae	1	6.7	
Berberidaceae	5	38.5	Saxifragaceae	1	5.6	
Cuscutaceae	5	20.0	Solanaceae	1	4.5	
Cyperaceae	5	5.7	Thymelaeaceae	1	25.0	
Salicaceae	5	14.7	Vitaceae	1	25.0	

well as other Middle Asian countries, e.g. Afghanistan (Breckle, 2007). The extraordinary species richness of the Pamir-Alai can be additionally explained by the fact that during the Quaternary glaciations, ice sheets did not estroy the valley vegetation with mesophilous forests, which have become a refuge for Tertiary floras (Safarov, 2003).

The Tajik endemics belong to 60 families, and the richest in endemic taxa are families: Fabaceae, Asteraceae, Lamiaceae, Apiaceae, Liliaceae, Brassicaceae, Caryophyllaceae, Poaceae, Rosaceae, Boraginaceae Amarylidaceae and Ranunculaceae (Table 3). In 17 families, there is only a single endemic species, while Betulaceae, Iridaceae, Santalaceae and Liliaceae families are those with the highest proportion of endemic taxa.

There are no endemic families in Tajikistan, but 12 endemic and 14 subendemic genera are considered to be unique to the country (Table 4). The subendemic genera include species that generally occur in Pamir-Alai, however, also have stations in the western sections of the Tian-Shan ranges in Kyrgyzstan. The richest in endemic species is the genus *Astragalus*, with 173 endemic species. This is the richest in species

genus in the world, having its centre of occurrence in Middle and Southwest Asia. The genus *Astragalus* is an important element of mountainous and steppe habitats. Its exceptional richness probably is related to niche diversification in the middle to late Pleistocene when environmental conditions in the mountain regions of Southwest and Central Asia cycled repeatedly between dry and more humid conditions (Bagheri et al., 2017).

Many endemics were also recorded in the genera *Cousinia*, *Allium*, *Oxytropis*, *Silene* and *Scutellaria*. The largest group of endemics in Tajikistan are herbaceous perennials (1,184 species). Much less numerous are bushes and shrubs (121), annual plants (93) and biennial plants (52). The lowest number of endemics is found amongst trees (35).

Distribution patterns of endemic plants in Tajikistan

The number of endemic plants varies between the geobotanical regions in Tajikistan. The richest in the number of endemic species are two areas in northwestern Tajikistan, i.e. the Hissaro-Darvasian A and Zeravshanian B regions (Figure 8).

Table 4. Endemic and subendemic genera in the flora of Tajikistan (after Nowak, Nowak, et al., 2011, supplemented).

Endemic genera	Subendemic genera		
Lagoseriopsis (Asteraceae)	Anacantha (Asteraceae)		
Cryptocodon (Campanulaceae)	Sergia (Campanulaceae)		
Catenulina (Brassicaceae)	Cylindrocarpa(Campanulaceae)		
Tetracmidion (Brassicaceae)	Dichasianthus (Brassicaceae)		
Iskandera (Brassicaceae)	Wikstroemia (Thymelaeaceae)		
Thlaspidium (Brassicaceae)	Chaetolimon (Limoniaceae)		
Spirostegia (Scrophulariaceae)	Cephalorhizum (Limoniaceae)		
Lipskya (Apiaceae)	Cephalopodum (Apiaceae)		
Neopaulia (Apiaceae)	Mediasia (Apiaceae)		
Kafirnigania (Apiaceae)	Dimorphosciadium (Apiaceae)		
Kuhitangia (Caryophyllaceae)	Mogoltavia (Apiaceae)		
Malacurus (Poaceae)	Fergania (Apiaceae)		
	Sympegma (Chenopodiaceae)		
	Korolkowia (Liliaceae)		

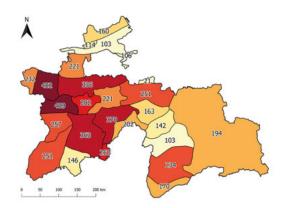


Figure 8. Richness of endemic vascular taxa in geobotanical regions.

In the east, the highest number of endemic plants is noted in the East Tajikistanian A and West Pamirian B regions. As the areas of the geobotanical regions are different in size, the richness of endemics was weighted per area – 100 km². As a result, we discovered a different pattern of endemism hotspot distribution, with Hissaro-Darvasian F, Mogoltausian, Zeravshanian A, Turkestanian B, Hissaro-Darvasian A and B as the richest (Figure 9). In terms of the number of exclusive endemics, south Tajikistanian C leads, where 54 endemics have been noted.

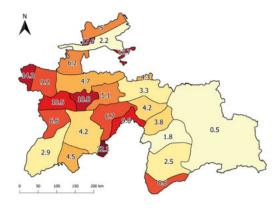


Figure 9. Weighted per 100 km² richness of endemic plants in geobotanical regions of Tajikistan.

Most endemics in Tajikistan are narrowly distributed and inhabit only one or two geobotanical subregions. Only a few were noted in more than 5 or 6 subregions. The maximum distribution was noted for *Heracleum lehmannianum*, *Korshinskya olgae* and *Linaria poporii* (which occur in more than 20 subregions). To the group of endemics which are characterised by

a relatively wide distribution belong also *Amygdalus* bucharica, *Artemisia porrecta*, *Astragalus xanthomeloides* and *Aulacospermum roseum* (18 subregions) and *Dianthus crinitus* subsp. *tetralepis* (19 subregions).

The range size of endemic varies from around 486 to 111,489 km². Subendemics are characterised by significantly wider distributions. The range size of subendemics varies between 11,830 and 349,473 km². In the whole group of endemics, species with small ranges predominate.

The regional inequality in the concentration of endemics is a result of very varied land relief in Tajikistan and significant differences in elevation. The hotspots of endemic plants are located in medium height mountains with warm to moderately warm microclimate and high rainfall reaching up to 2,000 mm per year within geographically isolated mountains (see Agakhanjanz & Breckle, 2002). In the case of the East Pamirian region, the uniqueness of the flora is related to the distinct and arid climate. This is one of the harshest, driest and certainly most elevated regions of Tajikistan, separated from other regions by very high ranges that reach up to 7,500 m a.s.l. Both the extremity of climate and habitats specificity are the main factors that influence the distinctiveness of this flora (Tribsch & Schönswetter, 2003).

Habitat preferences and altitudinal amplitude

Endemic species are generally confined to one particular type of biotope or plant community. Occasionally, these species are listed in two similar vegetation types. Only in a few cases endemics have been found in several different habitats. *Pedicularis krylovii* has been noted in eight, and *Senecio franchetii* and *Solidago kuhistanica* in nine different types of habitats.

The highest number of endemic species have been reported from rocks and screes, but also from steppes and semi-savannas, alpine juniper forests, thermophilous shrubs ('shiblyak'), alpine meadows and dwarf bushes (Table 5). For the 430 endemics occurring exclusively in one vegetation type, the most important biotopes are rock habitats, alpine swards as well as steppe.

Habitats that harbour the highest number of endemic taxa are characterised by a patchy character, low plant coverage and low productivity. This confirms the rule that endemics are taxa with low ecological flexibility (Kruckeberg & Rabinowitz,

Table 5. Distribution of Tajik endemic species across habitats (after Nowak, Nowak, et al., 2011, supplemented.

Habitat type	Number of endemics	Number of exclusive endemics	
Scree vegetation	822	169	
Steppes	371	13	
Alpine Juniper forests	355	15	
Thermophilous shrubs (shiblyak)	273	19	
Alpine meadows and swards	271	35	
Rock vegetation	231	64	
Xerophilous dwarf shrubs (rosaria)	208	7	
Riverbed vegetation	184	22	
Semi-savannas	173	30	
Broad-leaved forests (chernolesya)	147	7	
Meadows and pastures	147	13	
Riverside forests (bielolesya)	85	15	
Tall forbs	65	1	
Fen-spring vegetation	55	7	
Salt marsh vegetation	53	8	
Agrocoenoses	32	2	
Deserts and semi-deserts	28	1	
Gallery forests	9	1	
Littoral vegetation	9	1	
Aquatic vegetation	1	1	

1985) and competitiveness (Wilson & Keddy, 1986), preferring areas of loose and patchy communities, in early stages of succession or extreme habitats.

In Tajikistan, with increasing elevation, the number of native species first increases up to the subalpine belt, and then decreases. This hump-shaped relationship is repeated as far as the percentage of endemic species is concerned. However, slightly skewed to the higher elevation in the alpine belt (Figure 10). When not weighted by area, this relation is typically hump-shaped with the most numerous group of endemics associated with an altitude of about 1,800, 2,000 and 2,500 m a.s.l. More than 400 endemic species occur in the zone between 1,500 and 2,000 m and more than 300 between 1,000 and 3,000 m (Figure 10).

When we relate the number of endemic species to altitudinal belts, the peak of the endemism in Pamir-Alai occurs in subalpine belts and then – according to the Rappaports rule that explains the wider ranges of species typical for higher altitudes – is decreasing. The same pattern holds for the number of endemics as well as their share in relation to the total flora (Figure 11).

This pattern is generally similar to other mountainous regions of the world, with the highest number of stenochorous taxa on medium elevations of the subalpine zone (Agakhanjanz & Breckle, 2002; Essl et al., 2009; Van der Werff & Consiglio, 2004).

A decrease in the number and share of endemics is seen in the nival zone, where a more severe microclimate prevails and the history of vegetation is

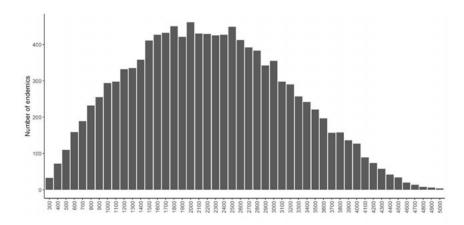


Figure 10. Altitudinal distribution of endemic vascular plant taxa shown as a number of endemics occurring in 100 m altitudinal belt.

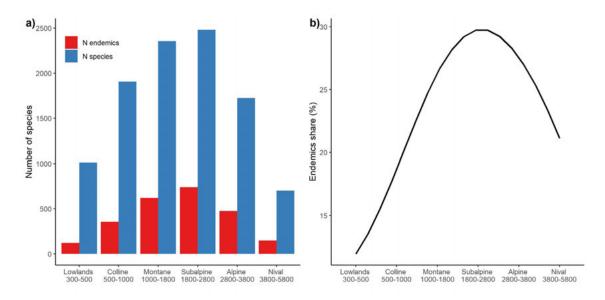


Figure 11. The endemism of Tajikistan in relation to altitudinal zonation (a) and total plant richness (b).

considerably shorter (Agakhanjanz & Breckle, 1995). However, the relationship needs to be thoroughly analysed, and should take into account glacier cover and the land area of particular elevational belt.

CONSERVATION

There is no credible information about the number of vascular plant species, especially endemics, that shoud be considered as threatened or legally protected in Tajikistan. The repeatedly issued Red Book of the country includes first 209 and later 239 vascular plant

species (Hisorev, 2015; Narzikulov, 1988). Sixteen plant species are extinct in the territory of Tajikistan (Safarov, 2003). However, the evaluation of species was based on uncertain criteria and not in accordance with the IUCN recommendations. The number of taxa assessed as threatened in surprisingly low, as the threats from urbanisation, agriculture and climate change in the area are the strongest when compared to other regions of Central Asia. The mountains of the Pamir-Alai are particularly sensitive to climate change due to the low adaptive capacity of its ecosystems, and has already been affected by glacier melting

related to mean temperature increase (Makhmadaliev et al., 2003). As we only consider the three mostly threatened habitats (Nowak, Nowak, et al., 2011), i.e. riverside forests, broad-leaved forests and alpine juniper forest, the number of potentially threatened taxa is more than 750. This shows the deficiencies in flora conservation.

In addition, the gallery forests are under considerable threat due to clear cuttings and unconstrained use by local people. Only the Tigrovaya Balka National Park effectively protects the stands of Populus pruinosa. Tajik's natural heritage is under severe threat from climate change as well as habitat fragmentation and degradation. Around 50% of forests have disappeared in the past 100 years, which results in massive soil erosion and increased risk of landslides. Several types of riverside forests, e.g. those with stands of Fraxinus sogdiana, Populus pruinosa and Platanus orientalis have almost entirely vanished. Uncontrolled medicinal plant harvest also poses a significant threat to many species with small population sizes. In the last few years the government of Tajikistan has also started several hydroelectric investments and road construction projects. The population of the country is still growing and unsustainable use of natural resources is an increasing factor as a third of the population lives below the poverty line.

Large protected areas have been established in recent decades in the Pamir-Alai that cover ca. 22% of the country territory (Safarov, 2003). Additionally, a number of programs and strategies have been developed to enhance biodiversity conservation and management of protected areas. However, in practice, they are insufficiently managed. The areas representing category Ia of IUCN conservation areas are Strict Nature Reserves, so-called zapovedniki, that are assigned with staff and headquarters that are committed with conservation responsibilities within the area. In Tajikistan, four Strict Nature Reserves were established.

Tigrovaya Balka Nature Reserve is located in south-western foothills of Pamir-Alai in the confluence area of the Amu Darya and Vakhsh Rivers. It is devoted to protect riparian habitats of subtropical climatic zone, the former habitat of the Caspian Tiger. The second nature reserve is called Romit, It was created in 1956 in the area of Hissar Mts. The aim of conservation efforts here are the

preservation of mid-altitude mountain ecosystems with extremely rich flora and fauna. The third nature reserve is Dashtidjum, designed for the protection of one of the most precious and unique biocoenoses in the Middle Asia with flashy broad-leaved forests, riverbed thickets and slope tall-herbs and semisavanna. The share of endemic species is the highest here if compared to other regions of the Pamir-Alai. Zorkul is the fourth nature reserve. It is located in the eastern Pamir around the quake lake. The area includes well sustained steppe, semi-desert as well as high-altitude pastures and meadows. The Zorkul depression with its lakes, wetlands, and surrounding mountains offer suitable habitats for birds. In 2001, this protected area was added to the Ramsar list of wetlands. Besides, it is also on the proposal list for future world heritage nominations (Diment et al., 2012). This area was designated as early as 1972 as a nature sanctuary (zakaznik). In 2000 it was extended to an area of 877 km² and upgraded to a Strict Nature Reserve (zapovednik, IUCN Category Ia).

Additionally, nineteen species management areas were established on the territory of Tajikistan. Unfortunately, they are rather not particularly devoted to plant protection. An exception is Almasi Zakaznik that was created for *Ungernia victoris* preservation. Other areas are Saivotin, Childukhtaron, Kusavlisai and Dashtijum Zakaznik that were established partly for juniper woods protection, and Zeravshan Zakaznik with the goal to preserve riverbed vegetation.

With ca. 26,000 km², the Pamir National Park is the largest among the protected areas in Tajikistan. It was founded in 1992 and added to UNESCO world heritage in 2013. The area comprises predominantly unsettled, mountainous landscape, including the Fedtchenko Glacier, which with a length of 77 km it is the biggest glacier in the Pamir and one of the longest valley glaciers outside the polar regions (Haslinger et al., 2007). The Pamir National Park is the only state park devoted to the protection of natural heritage. The Shirkent National Park was established mainly for the preservation of historical heritage.

Many protected areas in the Middle Asia were established under the Soviet government and their protection categories follow the Russian standards. About 220,000 km² of land is protected in the whole Middle Asia (UNEP 2014–2017) and the density of conservation sites is particularly high in the mountain regions. Despite application of protection system

network in Tajikistan, the conservation efforts are not fully effective because governmental institutions are still not able to monitor and manage all the valuable plant populations and vegetation types. The compilation of an endangered species list with a brief description of species and their main threats (Hisorev, 2015) only slightly improves the situation. There is no law for the protection of plant species in Tajikistan. Even in strict nature reserves, shortages and staff absences cause serious problems with an efficient response to upcoming threats as, for example, mining in the Romit Valley and related road construction.

Raising the effectiveness of conservation in Pamir-Alai requires urgent action plans with the establishment of specific priorities for the hotspots of plant diversity. The identification of a microhotspot within the global hotspot of Mountains of Central Asia is necessary, particularly for the most threatened ecosystems such

as forests and grasslands. The need for a stronger national administration must be emphasised to deal with biodiversity conservation, which must involve the provision of financial support by international organisations. At the national level, the system of nature conservation should be improved so as to take better account of centres of endemism, as well as improving the connectivity of the ecological network and enhancing the adaptive capacity of the most sensitive areas by ensuring a balance between traditional management practices and economic growth of local economies. All these points would not be achievable without a through inventory of current species distribution, analyses of their population sizes and phenology changes. This knowledge is an indispensable but still neglected step in conservation actions in Tajikistan.



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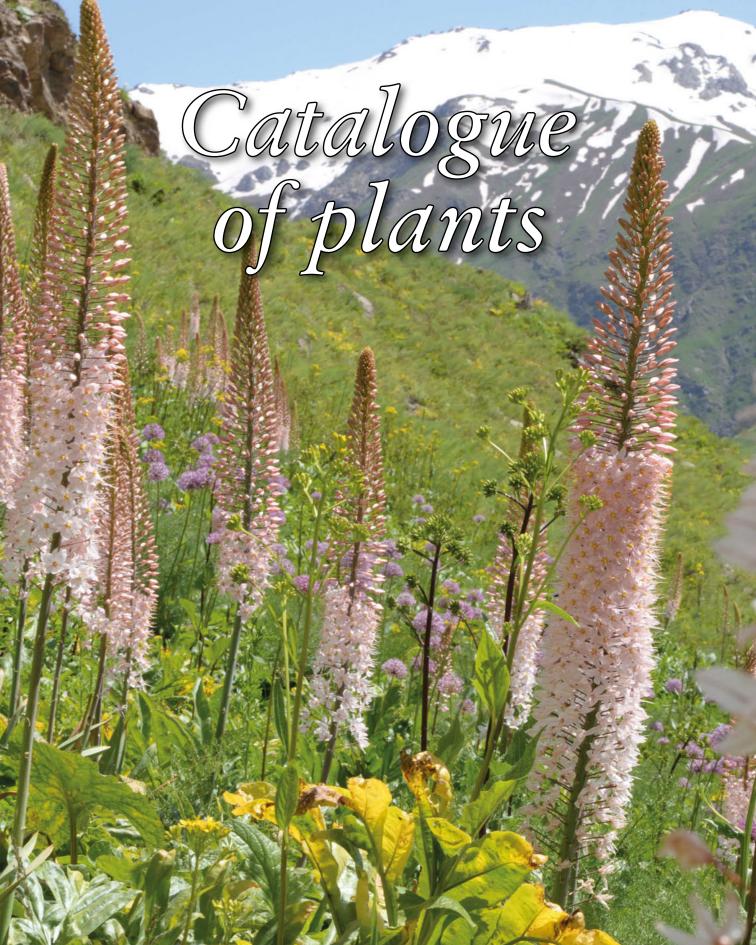
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CATALOGUE OF PLANTS

Species were ordered alphabetically according to their Latin names within each family. Beside the Latin name and most commonly used synonyms, general distribution across phytogeographical regions, typical habitats, elevation range, flowering period, diagnostic remarks, map of the distribution of particular species in Tajikistan are presented.

ABBREVIATIONS:

Endemism: E – endemic species for Tajikistan, SE – subendemic species for Tajikistan, A – anthropogenic species.

Phytogeographical elements: I-T (Irano-Turanian), EI-T (East Irano-Turanian), E-S (Euro-Siberian), M (Mediterranian), S-S (Saharo-Sindian), S-A (Saharo-Arabian), C-A (Central Asian), Americ (American), Arctic (arctic), Austral (Australian), Himal (Himalayan), Orient (Oriental), Plurireg (a species with broad geographical distribution).

Usefulness: Foo (food), For (forage), Ind (industrial), Hou (household), Med (medicine), Orn (ornamental). Abbreviations in circles on the maps refer to a threat category of the species in Tajikistan according to Nowak et al. (2020): CR (critically endangered), EN (endangered), VU (vulnerable), NT – (near threatened), LC (least concern), NE (not evaluated).

Species occurring in adjacent areas (absent in Tajikistan, but with potential to be found) are marked with bold line of the border of the possible range of a certain species.









1. Alisma lanceolatum With.

Synonyms: Alisma stenophyllum (Aschers. & Graebn.) Sam.



Phytogeographical element: I-T, M, E-S

Habitat: Littoral vegetation, aquatic vegetation, water

bodies

Elevational range: 800 - 950 Flowering period: V - VII

Remarks: Cryptophyte; plant 20–60(–90) cm high; stamens with long anthers, style longer than the ovary, leaves

cuneate

2. Sagittaria trifolia L.



Phytogeographical element: Orient, I-T, E-S

Habitat: Fields, littoral vegetation, aquatic vegetation

Elevational range: 350 - 950 Flowering period: V - VII

Remarks: Cryptophyte; plant 30–60 cm high; leaves aerial at least when mature, sagittate, sheathing, apex acuminate to rounded, lateral lobes longer than the middle; inflorescences racemose, in 3 to many whorls of 3 flowers, lower 1–3 whorls usually branched; flowers unisexual; female flowers on lower 1–8 whorls, with short pedicels; male flowers with pedicels 0.5–1.5 cm.

Usefulness: Foo.

3. Amaranthus blitoides S. Watson



Phytogeographical element: A, Plurireg

Habitat: Ruderal, fields Elevational range: 550 - 750 Flowering period: VI - IX

Remarks: Therophyte; plant 10–30 cm high; tepals 4, rarely 5, green, ovate-lanceolate to oblong-lanceolate, 1–2.5 mm,

apex acuminate and pointed.

4. Amaranthus blitum L.

Synonyms: Amaranthus lividus L.



Phytogeographical element: A, Plurireg

Habitat: Ruderal, fields Elevational range: 650 - 950 Flowering period: VIII - X

Remarks: Therophyte; plant ascending, 10-30 cm high; leaf blade ovate $1.5-4.5\times 1-3$ cm, base cuneate, margin entire or slightly undulate, apex notched, with a mucro; seeds black to brownish-black, circular, ca. 1.2 cm in diameter.

Usefulness: For.

5. Amaranthus deflexus L.



Phytogeographical element: A; Plurireg Habitat: Anthropogenic habitats Elevational range: 800 - 950 Flowering period: VI - VIII

Remarks: Therophyte; plant 10–50 cm; flowers green, in slender and lax to stout and dense terminal and axillary spikes; capsule ellipsoid, distinctly exceeding the perianth; seeds compressed-ellipsoid.

6. Amaranthus retroflexus L.



Phytogeographical element: A; Plurireg

Habitat: Ruderal, fields Elevational range: 500 - 2200 Flowering period: VI - VIII

Remarks: Therophyte; plant erect, 20–80 cm high, pubescent; leaf blade ovate-rhomboid or elliptic, 5– 12×2 –5 cm, base cuneate, margin entire and undulate, apex acute or notched, with a mucro; seeds brown or black, subglobose, ca. 1 mm in diameter, obtuse at margin.

Usefulness: For.













7. Amaranthus thellungianus Nevski

Synonyms: Amaranthus graecizans subsp. thellungianus (Nevski) Gusev



Phytogeographical element: A, I-T

Habitat: Fields

Elevational range: 550 - 1100 Flowering period: VII - IX

Remarks: Therophyte; plant 25–70 cm high; leaf blade linear-lanceolate, oblong-lanceolate to rhomboid-spathulate, 1.5–3.5 × 0.5–1 cm, slightly retuse at the mucronulate tip; perianth segments and bracteoles gradually narrowed, distinctly (0.3–0.75 mm) mucronate; seeds shining, compressed, black, ca. 1 mm in diameter.

8. Anabasis truncata (Schrenk) Bunge

Synonyms: Anabasis pulcherrima Iljin



Phytogeographical element: I-T Habitat: Salt marshes, steppes Elevational range: 600 - 2150

Flowering period: VI

Remarks: Chamaephyte; subshrub 10–20 cm high; caudex brown, densely tomentose; annual branches numerous, each one with 8–12 internodes; leaves scale-like, semiorbicular 1–2 mm, apex without mucro; flowers solitary in leaf axils; bractlets ovoid or oblong with membranous margin; outer 3 perianth segments broadly elliptic to oblong, winged in fruit.

9. Anabasis turkestanica Korovin ex Iljin

Synonyms: Anabasis gontscharowii Iljin



Phytogeographical element: I-T Habitat: Salt marshes, forbs Elevational range: 400 - 600 Flowering period: V - VI

Remarks: Chamaephyte; subshrub 25–50 cm high; annual branches numerous, with 15–25 internodes each; leaves opposite, fused at base with white hairs; leaf blade scale-like, semiorbicular, triangular or triangular-ovoid, 0.5–1 cm, margin yellowish or reddish, apex with mucro; bractlets boat-shaped, membranous shorter than perianth; 3 of perianth segments winged.

10. Anthochlamys tjanschanica Iljin ex Aellen



Phytogeographical element: I-T Habitat: Semi-deserts, salt marshes

Elevational range: 1000 Flowering period: VI - VIII

Remarks: Therophyte; plant up to 50 cm high, erect; leaves oval to oblong and oblong-lanceolate, short-petioled; flowers in terminal spiciform inflorescence, ebracteolate solitary; perianth deeply 5-partite, with 2-lobed oblong segments; ovary pyriform with 2 sessile stigmas; fruit vertical, compressed, winged.

11. Atriplex flabellum Bunge ex Boiss.



Phytogeographical element: I-T

Habitat: Fields

Elevational range: 300 - 2000 Flowering period: V - VII

Remarks: Therophyte; plant 20–100 cm high; stems erect, usually branched, densely hairy; leaf blades farinose, covered with white-silver hairs, sometimes with bladderslike structures with entire, serrate or lobed margin; bracts during fruiting with prominent veins, 10–20 mm, margins dentate; male flowers with 5-parted perianth.

Usefulness: For.

12. Atriplex moneta Bunge ex Boiss.

Synonyms: Atriplex bucharica Iljin



Phytogeographical element: I-T Habitat: River beds, ruderal, fields Elevational range: 350 - 2000 Flowering period: IV - VI

Remarks: Therophyte; plant 10–50 cm high; stems usually whitish; leaves alternate, petiolate; leaf blade rounded or broad-ovate, yellowish-green, abaxially farinose, base heart-shaped, apex rounded, margin entire or with sparse, weakly developed teeth; bracts during fruiting almost entirely united, widely winged, 10–17 mm, with 3 veins.













13. Atriplex pamirica Iljin

Synonyms: Atriplex tatarica L. var. pamirica (Iljin) G.L. Chu



Phytogeographical element: SE, I-T Habitat: River beds, fields Elevational range: 1500 - 4200

Flowering period: VII

Remarks: Therophyte; plant 20–80 cm high; leaf blade abaxially densely gray-white furfuraceous, adaxially green, lower cauline leaf blade margin usually irregularly serrate, upper cauline leaf blade linear-oblong, oblong or narrowly triangular, margin entire or remotely toothed; bracts during fruiting rhomboid-ovate to ovate, central part yellow-white with a few tuberculate appendages.

Usefulness: For, Hou, Hol.

14. Atriplex schugnanica Iljin



Phytogeographical element: SE, I-T Habitat: Loose sandy screes, screes Elevational range: 1500 - 3500

Flowering period: VIII

Remarks: Therophyte; plant up to 50 cm high; stems ascending to erect, branched from the base; leaves alternate, petiolate, ovate to triangular-hastate; bracts rhomboid or oblong-ovate entire or toothed, united in lower part, farinose, obscurely nerved, short-stipitate.

15. Atriplex sibirica L.

Synonyms: Obione sibirica (L.) Fisch.



Phytogeographical element: EI-T, E-S

Habitat: Fields

Elevational range: 3000 - 4000 Flowering period: VII - IX

Remarks: Therophyte; plant 20–50 cm high; leaves gray-green, petiolate; leaf blade ovate-triangular to rhomboid-ovate, 3–5 \times 1.5–3 cm, abaxially gray-white furfuraceous, adaxially gray-green, margin sparsely serrate, apex subobtuse; bracts during fruiting connate proximally, inflated, subobovoid, 5–6 \times ca. 4 mm, woody, covered with thornlike appendages.

16. Atriplex tatarica L.

Synonyms: Atriplex arazdajanica Kapeller, A. multicolora Aellen



Phytogeographical element: I-T, E-S, M

Habitat: River beds, semi-deserts, ruderal, fields

Elevational range: 350 - 4500 Flowering period: VIII

Remarks: Therophyte; plant 20–80 cm high; leaf blade abaxially densely gray-white furfuraceous, adaxially green, lower cauline leaf blade margin usually irregularly serrate, upper cauline leaf blade oblong to triangular-ovate, margin irregularly serrate or sinuately lobed; bracts during fruiting rhomboid-ovate to ovate, central part yellow-white with a few tuberculate appendages.

Usefulness: For.

17. Bassia dasyphylla (Fisch. & C.A. Mey.) Kuntze

Synonyms: Kochia dasyphylla Fisch. & C.A. Mey.



Phytogeographical element: EI-T Habitat: River beds, loose sandy screes Elevational range: 3700 - 3800 Flowering period: VIII - IX

Remarks: Therophyte; plants 20–50 cm high; extremely branched, appearing globose, densely villous; leaves alternate, terete or semiterete, $0.3-1.5~\rm cm \times 1-1.5~\rm mm$, succulent, base attenuate, apex obtuse; flowers bisexual, solitary or paired, usually only 1 flower developing; perianth 5-lobed, villous with abaxial appendages of segments subulate in fruit.

18. Bassia prostrata (L.) Beck

Synonyms: Kochia prostrata (L.) Schrad.

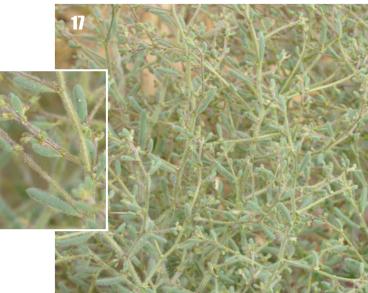


Phytogeographical element: I-T, M, E-S Habitat: Semi-deserts, salt marshes Elevational range: 400 - 3800 Flowering period: VI - IX

Remarks: Chamaephyte; subshrub 20–80 cm high; stems subglabrous, yellow-brown or gray-white pilose; leaves usually clustered on dwarf, axillary branchlets, sessile, linear, $0.8–2\times0.1–0.15$ cm; perianth globose, densely sericeous; segments ovate or oblong, apex obtuse; winglike appendages with purple-red or blackbrown veins, membranous, margin irregularly crenate or erose.

Usefulness: For.













19. Camphorosma monspeliaca L. subsp. lessingii (Litv.) Aellen

Synonyms: Camphorosma lessingii Litv.



Phytogeographical element: I-T, E-S

Habitat: Loose sandy screes, semi-deserts, salt marshes

Elevational range: 400 - 2500 Flowering period: VI - X

Remarks: Chamaephyte; subshrub 10–50 cm high; branches ascending to erect, dense, short; leaves fascicular on dwarf branches, sessile, linear, ca. 5 mm; inflorescence ca. 4 mm in diameter; lateral perianth segments subequaling middle ones;

utricle ca. 1 mm in diameter. Usefulness: For.

20. Celosia argentea L.



Phytogeographical element: Plurireg

Habitat: Ruderal, fields Elevational range: 500 - 2000 Flowering period: VII - IX

Remarks: Therophyte; plant up to 100 cm high; stem erect, green or red, glabrous, often branched; leaves green, often tinged red; leaf blade oblong-lanceolate, lanceolate, or lanceolate-linear, rarely ovate-oblong, $5-8\times1-3$ cm; spikes long cylindric, not branched; perianth white or pink; tepals oblong-lanceolate.

Usefulness: Orn.

21. Ceratocarpus arenarius L.

Synonyms: Ceratocarpus utriculosus Bluk., C. turkestanicus Sav.-Rycz. ex Iljin



Phytogeographical element: I-T, E-S

Habitat: Loose sandy screes, ruderal, steppes

Elevational range: 350 - 1800 Flowering period: V - VII

utricle $5-10 \times 2-5$ mm.

Remarks: Therophyte; plant 5–30 cm high; leaves $0.5-4 \times 0.1$ –0.5 cm; perianth of male flowers yellow, ca. 1.5 mm, membranous; filaments short, filiform; anthers subglobose;

Usefulness: For.

8 Amaranthaceae

22. Chenopodium ficifolium Sm.



Phytogeographical element: A, E-S, I-T, M

Habitat: Ruderal, fields Elevational range: 1000 - 2200 Flowering period: V - VI

Remarks: Therophyte; plant 20–50 cm high; stem erect, ribbed; leaf blade ovate-oblong $2.5-5\times1-3.5$ cm, central lobe margins almost parallel; seeds horizontal, black, sublustrous, ca. 1 mm in diameter, distinctly hexagonally pitted.

23. Chenopodium foliosum Asch.

Synonyms: Chenopodium korshinskyi Litv.



Phytogeographical element: I-T, M, E-S

Habitat: River beds, pastures, nitrophilous rock footings, fields

Elevational range: 400 - 3800 Flowering period: VI - VII

Remarks: Therophyte; plant 20-70 cm high; leaf blade of lower leaves narrowly triangular-ovate $2-5 \times 2-3$ cm, equaling or longer than petiole, base cuneate, truncate, or hastate, margin irregularly dentate; flowers bisexual, female on short, axillary branches forming globose or cylindric-globose, linear glomerules; perianth red and succulent during fruiting.

24. Chenopodium glaucum L.

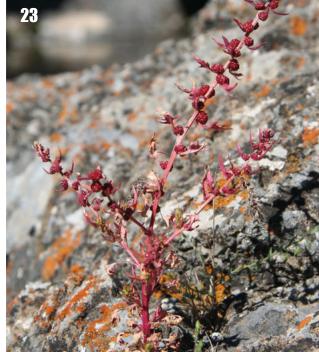


Phytogeographical element: I-T, M, E-S

Habitat: Ruderal, fields Elevational range: 450 - 3000 Flowering period: VII

Remarks: Therophyte; plant 20–40 cm high; leaf blade oblong-ovate to lanceolate, 2– 4×0.6 –2 cm, abaxially gray-white farinose, sometimes slightly reddish purple, adaxially glabrous, margin irregularly erose to dentate; flowers several per glomerule, arranged on branches in spicate or paniculate inflorescences; perianth segments 3 or 4, light green.







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25. Chenopodium iljinii Golosk.



Phytogeographical element: I-T Habitat: Ruderal, fields Elevational range: 3750 - 4200 Flowering period: VI - VIII

Remarks: Therophyte; plant 10–30 cm high; stem branched; leaf blade gray-green, ovate to ovate-triangular, ca. 0.5–1.5 × 0.4–1.2 cm, farinose on both surfaces, base broadly cuneate, margin entire or 3-lobed, apex subobtuse or acute; perianth segments 4 or 5, obovate-linear to oblong; seeds horizontal, black, sublustrous, 0.8–1.2 mm in diameter, subsmooth or slightly pitted.

26. Chenopodium litwinowii (Paulsen) Uotila



Phytogeographical element: EI-T Habitat: Semi-deserts, alpine steppes Elevational range: 3600 - 4700

Flowering period: VII - X

Remarks: Therophyte; plant 15–60 cm high; stems and leaves green-purplish; basal and lower cauline leaves long petiolate; leaf blade ovate, triangular-ovate or hastate, to 2.2×1.4 cm, margin dentate; perianth segments 3, becoming red and succulent during fruiting.

27. Chenopodium murale L.



Phytogeographical element: I-T, M, E-S

Habitat: Ruderal, roadsides Elevational range: 800 - 1900 Flowering period: VI - IX

Remarks: Therophyte; plant to 70 (–90) cm, usually erect, often much branched; leaves usually olive green, sometimes yellowish or tinged with red, +/- farinose; petiole shorter than or equal to blade; perianth segments 5, connate below the middle, prominently keeled near apex, green; seeds horizontal, black, 1.1–1.4 mm in diameter, round in outline.

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28. Chenopodium rubrum L.



Phytogeographical element: Plurireg Habitat: River beds, ruderal, fields Elevational range: 350 - 2500

Flowering period: VIII

Remarks: Therophyte; plant 30–80 cm high; stems green or reddish, ribbed, erect; leaves 4–8 × 2–6 cm, 3–5 × as long as petiole, succulent; perianth segments 3 or 4, green, often becoming red at maturity; seed vertical, oblique, or horizontal, red-black to black, globose, slightly depressed, 0.75–1 mm in diameter, distinctly oblong pitted.

Usefulness: Med, Foo.

29. Chenopodium vulvaria L.



Phytogeographical element: Plurireg

Habitat: Ruderal, fields Elevational range: 400 - 3800 Flowering period: VII - VIII

Remarks: Therophyte; plant up to 30 cm with unpleasant smell; stems erect or procumbent, usually much branched; leaf blade broadly trullate or broadly ovate, 0.5–3 cm long, grey-farinose, margin entire; perianth segments 5; seeds horizontal, brownish-black 0.9–1.2 mm in diameter,

round in outline.

30. Climacoptera transoxana (Iljin) Botsch.

Synonyms: Salsola transoxana Iljin



Phytogeographical element: SE, I-T Habitat: Fields, salt shrubs, salt marshes

Elevational range: 350 - 900 Flowering period: VI - VII

Remarks: Therophyte; plant 20–60 cm high, much branched, green; densely villous in lower part and with scattered bristle-like hairs in the upper part; leaves succulent 1–3 (–3.5) cm, apex obtuse; perianth 5–6 mm, lanceolate, wings ca. 1.5 cm, purplish or yellowish.

Usefulness: For.













31. Climacoptera turcomanica (Litv.) Botsch.

Synonyms: Halanthium lipskyi Paulsen, Salsola turcomanica Litv.



Phytogeographical element: I-T Habitat: Salt shrubs, salt marshes Elevational range: 320 - 700 Flowering period: VII

Remarks: Therophyte; plant 15–60 (–100) cm high, much branched, greyish–green; densely villous in lower part, at the end of the season subglabrous; leaves succulent 0.5–1 (–1.5) cm, apex obtuse; perianth 3–4 mm, lanceolate

or ovoid, wings 1–1.4 cm.

Usefulness: For.

32. Corispermum hilariae Iljin

Synonyms: Corispermum dutreuilii Iljin



Phytogeographical element: EI-T Habitat: Alpine semi-deserts, sands Elevational range: 3800 - 3900

Flowering period: VII

Remarks: Therophyte; plant 5–15 cm high, sparsely hairy, few branched from base, erect; leaves linear or oblanceolate, to 3.5×0.3 –0.5 cm, 1-veined; spikelike inflorescence 2–14 cm, +/- crowded; utricle oblong-obovate 3–4 \times 2–2.5 mm, wings broad, thick, slightly crisped, margin irregularly denticulate-toothed.

33. Corispermum lehmannianum Bunge



Phytogeographical element: I-T Habitat: Sands, roadsides Elevational range: 300 - 400 Flowering period: VI - VII

Remarks: Therophyte; plant 15–40 cm high; stem erect, much branched; lower branches ascending; utricle broadly

elliptic, $2-3 \times 1.5-2$ mm, glabrous.

Amaranthaceae

34. Dysphania botrys (L.) Mosyakin & Clemants

Synonyms: Chenopodium botrys L., Neobotrydium botrys (L.) Mold., Teloxys botrys (L.) W.A. Weber



Phytogeographical element: I-T, M, E-S Habitat: River beds, screes, fields Elevational range: 650 - 2400 Flowering period: VI - VII

Remarks: Therophyte; plant 20–50 cm high, yellowish with a nice smell, glandular; leaf blade oblong $2-4 \times 1-2$ cm, margin pinnately parted; lobes obtuse, usually toothed; seeds horizontal, black, sublustrous, depressed, 0.75-1 mm.

Usefulness: Med, For, Hou.

35. Gamanthus leucophysus Botsch.



Phytogeographical element: E, I-T

Habitat: Steppes

Elevational range: 700 - 1800 Flowering period: V - VIII

Remarks: Therophyte; plant 3–45 cm high; leaves 0.5–5 cm long, succulent; inflorescence with 2–5 flowers or flowers solitary; bracts longer than flowers, apex stipitate; perianth segments lanceolate, 5–6 mm long; anther appendages whitish, ovoid or cuneate.

36. Girgensohnia oppositiflora (Pall.) Fenzl



Phytogeographical element: I-T

Habitat: Salt shrubs, salt marshes, thermophilous shrubs

Elevational range: 600 - 3050 Flowering period: V - VI

Remarks: Therophyte; plant 15–40 cm high; branches opposite, green or reddish, hispid; perianth segments oblong-lanceolate, membranous, slightly enlarged and becoming papery in fruit, outer 3 segments abaxially upined upines outer.

winged, wings ovate. Usefulness: For.













37. Halimocnemis mollissima Bunge



Phytogeographical element: I-T

Habitat: Salt shrubs, salt marshes, thermophilous shrubs

Elevational range: 450 - 1000 Flowering period: VI - VII

Remarks: Therophyte; plant 10–30 cm high; densely pubescent with admixture of villous hairs; leaves succulent, $1-4(-5.5) \times 0.2-0.4$ cm, apex aristate awned; perianth at the time of fruiting with obtuse apex.

38. Halogeton glomeratus (M. Bieb.) Ledeb.



Phytogeographical element: I-T, E-S Habitat: River beds, ruderal, steppes Elevational range: 450 - 4000 Flowering period: VI - VII

Remarks: Therophyte; plant 5–30 cm high; branches alternate, gray-green, smooth or densely papillate; leaves 4–12 × 1.5–2 mm, apex aristate awned; perianth segments lanceolate, membranous; abaxial wing semiorbicular, distinctly veined; seeds vertical.

Usefulness: For.

39. Halostachys belangeriana (Moq.) Botsch.

Synonyms: Arthrocnemum belangerianum Moq., Halostachys caspica C.A. Mey., Salicornia caspica Pall.



Phytogeographical element: I-T Habitat: River beds, salt marshes Elevational range: 300 - 800 Flowering period: VII - IX

Remarks: Nanophanerophyte; shrub up to 3.5 m high; stems branched, almost leafless, papillose at least when young; leaves scale-like, very short, triangular at apex; inflorescences spiciform, $1.5-2.5 \times 2-4$ mm, many, mostly opposite, borne on jointed peduncles; perianth segments

united; stamen 1, stigmas 2.

40. Krascheninnikovia ceratoides (L.) Gueldenst.

Synonyms: Eurotia ceratoides (L.) C.A. Mey., Krascheninnikovia ceratoides subsp. alticola Ovcz. & Kinz.



Phytogeographical element: EI-T

Habitat: River beds, loose sandy screes, alpine semi-deserts

Elevational range: 3000 - 4400 Flowering period: VII - IX

Remarks: Chamaephyte; shrub 10-40(-100) cm high; stems with stellate-dendroid hairs; leaves ovate, oblong, ovate-lanceolate or linear lanceolate, $1-2.5\times0.2-1$ cm, very shortly petiolate, obtuse or acute, entire with slightly revolute margins, 1-nerved; inflorescence spike-like, terminal, minute flowers in axillary clusters; female floral tube $1-2\times$ as long as free, 2-cornute part.

41. Microgynoecium tibeticum Hook. f.



Phytogeographical element: EI-T

Habitat: Nitrophilous rock footings, fields Elevational range: 3800 - 3850

Flowering period: VII - VIII

Remarks: Therophyte; plant erect up to 8–25 cm high, branched from the base; leaves ovate, acute or obtuse, 6–12 × 5–7 mm, entire to 3-lobed; staminate flowers in leaf axils; perior to 10.8 mm long, brownich

perianth up to 0.8 mm long, brownish.

42. Nanophyton erinaceum (Pall.) Bunge



Phytogeographical element: I-T, E-S Habitat: Semi-deserts, salt marshes Elevational range: 400 - 400

Flowering period: VI

Remarks: Chamaephyte; subshrub up to 30 cm high, usually smaller; stem twisted, sinuate, older branches crowded, with numerous lateral, dwarf, dry branches, annual branches green; leaves 1.5–5 mm, abaxially papillate; leaf axil with a bunch of hairs; bracts and bractlets similar, proximal margin membranous; perianth segments sublustrous, white-yellow, veinless, 8–12 mm in fruit.

40

















43. Salicornia europaea L.



Phytogeographical element: Plurireg Habitat: River beds, salt marshes Elevational range: 400 - 3900 Flowering period: VII - VIII

Remarks: Therophyte; plant 10–35 cm high; stems erect, much branched, fleshy; leaves undeveloped, scale-like, to 1.5 mm; perianth fleshy, obconic; seeds cylindric-ovoid ca. 1.5 mm.

44. Salsola drobovii Botsch.



Phytogeographical element: E, I-T

Habitat: Semi-deserts, salt shrubs, salt marshes

Elevational range: 1000 - 1100

Flowering period: VII

Remarks: Chamaephyte; subshrub 15–40 cm high; stem branched, the annual ones with whitish bark, glabrous; leaves linear 0.5–2.5 cm, apex obtuse; perianth with wings

6-9 mm in diameter.

45. Salsola kali L.

Synonyms: Salsola australis R. Br., S. pestifera A. Nels., S. ruthenica Iljin



Phytogeographical element: I-T, E-S Habitat: Fields, salt marshes Elevational range: 350 - 3000 Flowering period: VII - VIII

Remarks: Therophyte; plant up to 1–1.5 m high, green, glabrous or with scattered bristle like hairs; leaves linear 1–4(–6) cm, apex spinose; perianth wings 6–8 mm in

diameter.
Usefulness: For.

46. Salsola leptoclada Gand.

Synonyms: Salsola carinatiformis Kinzik.



Phytogeographical element: I-T

Habitat: Semi-deserts, deserts, salt marshes

Elevational range: 350 - 1350 Flowering period: VI - VII

Remarks: Therophyte; plant 5–50 cm high; stem branched, farinose in lower part and scatterly long hairy; leaves linear, obtuse at apex, 1–2.5 cm; perianth wings 8–12 mm

in diameter, pink. Usefulness: For.

47. Salsola paulsenii Litv.

Synonyms: Salsola pellucida Litv.



Phytogeographical element: EI-T, E-S Habitat: Semi-deserts, fields, salt marshes

Elevational range: 350 - 3000 Flowering period: VI - VII

Remarks: Therophyte; plant 15–40 cm high; stem branched from base, rigid, densely hispid; leaves, straight 1.5–3 cm \times 1.5–2 mm, apex spinose mucronate; perianth (including wings) 6–8 mm in diameter; 3 wings reniform

or semiorbicular, other 2 wings narrower.

Usefulness: For.

48. Salsola vvedenskyi Iljin & Popov



Phytogeographical element: E, I-T Habitat: Salt marshes, steppes Elevational range: 400 - 925 Flowering period: VII - VIII

Remarks: Therophyte; plant 15–60 cm high; stems erect, greyish, with a dense indumentum of short hairs and sparse bristle-like hairs; leaves linear 2–4 cm, apex obtuse;

larger wings 7–10 mm in diameter.













49. Spinacia turkestanica Iljin



Phytogeographical element: I-T Habitat: Pastures, ruderal, fields Elevational range: 450 - 1800

Flowering period: IV

Remarks: Therophyte; plant up to 70 cm high, glabrous; leaves with large triangular-hastate lobes, usually mucronulate at apex; inflorescence of male plants a panicle of almost leafless spike; female inflorescence leafy. Usefulness: For, Foo.

50. Suaeda acuminata (C.A. Mey.) Moq.



Phytogeographical element: I-T, E-S Habitat: River beds, salt marshes Elevational range: 300 - 600 Flowering period: VI - X

Remarks: Therophyte; plant 20–50 cm high; stem branches gray-green, subglabrous; leaves sessile, linear, 0.5–1.5 cm \times 1–1.5 mm, apex obtuse or subacute and with a bristle; perianth segments abaxially with a longitudinal keel near apex; utricle enclosed by perianth; pericarp free from seed.

51. Suaeda olufsenii Paulsen

Synonyms: Suaeda corniculata (C.A. Mey.) Bunge var. olufsenii (Pauls.) G.L. Chu



Phytogeographical element: EI-T Habitat: Salt marshes Elevational range: 3000 - 4100

Flowering period: VIII - IX

Remarks: Therophyte; plant 1–10 cm, prostrate or ascending, often purplish, glabrous; stem much branched from base, up to 2 mm thick; leaves few, often very succulent, linear to oblong 5– 10×0.8 –1.2 mm, subacute to subobtuse, delicately mucronate.

52. Allium alexeianum Regel

Synonyms: Allium nevskianum Wendelbo



Phytogeographical element: E, I-T

Habitat: Screes, steppes Elevational range: 1000 - 3200 Flowering period: VI - VII

Remarks: Cryptophyte; plant 5–15 cm high; leaves 1–2, longer than scape; tepals after flowering prickly, filaments

shorter than tepals.

53. Allium altissimum Regel



Phytogeographical element: I-T Habitat: Thermophilous shrubs Elevational range: 750 - 1600 Flowering period: IV - V

Remarks: Cryptophyte; plant up to 100 cm high; leaves linear-lanceolate, significantly shorter than scape;

filaments slightly shorter than tepals.

54. Allium barsczewskii Lipsky

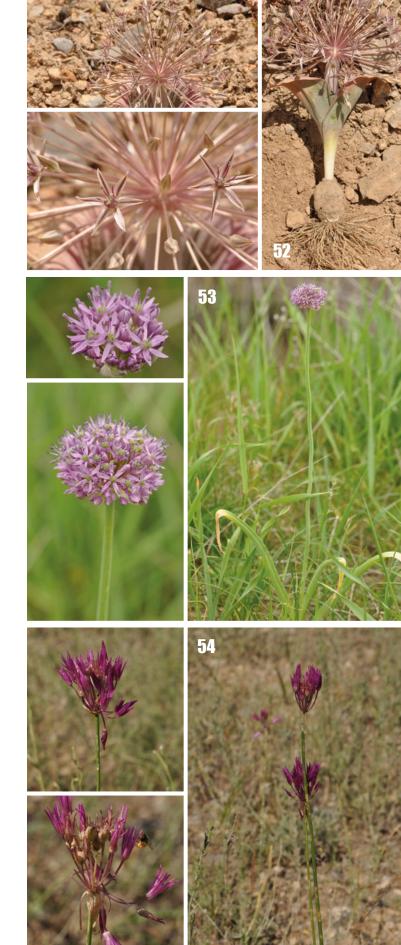


Phytogeographical element: I-T Habitat: Loose sandy screes, steppes Elevational range: 750 - 3500

Flowering period: V - VII

Remarks: Cryptophyte; plant 15–70 cm high; leaves 3–5, up to 5 mm wide; flower pedicels unequal, ovary without

crown-like outgrowths.











55. Allium bucharicum Regel



Phytogeographical element: E, I-T

Habitat: Meadows, steppes, thermophilous shrubs, forbs

Elevational range: 400 - 950 Flowering period: IV - V

Remarks: Cryptophyte; plant 10–30 cm high; leaves (2-)3-6(-9), linear 0.3-2 cm wide; tepals after flowering

hard, almost prickly.

56. Allium caesium Schrenk

Synonyms: Allium aemulans Pavl., A. renardii Regel



Phytogeographical element: I-T

Habitat: Juniper forests, rocks, steppes, forbs

Elevational range: 2000 - 2700 Flowering period: VI - VII

Remarks: Cryptophyte; plant 25-40 cm high; leaves 2-3, grooved, scabrous, 1–3 mm wide; filaments connate at base; filaments of inner stamens up to 2/3 of length

2-toothed. Usefulness: Foo.

57. Allium carolinianum DC.

Synonyms: Allium polyphyllum Kar. & Kir.



Phytogeographical element: I-T Habitat: Alpine swards, screes Elevational range: 2400 - 4050

Flowering period: VI - IX

Remarks: Cryptophyte; plant (10–)20–60 cm high; leaves 5–7, broadly linear; pedicels as long as tepals or up to 2 \times longer than tepals; filaments longer than the tepals.

58. Allium darwasicum Regel



Phytogeographical element: E, I-T

Habitat: Forbs

Elevational range: 1900 - 3300 Flowering period: V - VI

Remarks: Cryptophyte; plant (10–)20–30(–50) cm high; scape ribbed; leaves 1–2(–4), linear to narrowly linear-lanceolate; tepals with green vein; filaments connate for 1/2–3/5 their length, adnate to perianth segments.

59. Allium fedtschenkoanum Regel



Phytogeographical element: I-T

Habitat: Alpine meadows, fens and mires

Elevational range: 300 - 400 Flowering period: VII - VIII

Remarks: Cryptophyte; plant (10-)20-30(-80) cm high; leaves 1-2, cylindrical, fistular; filaments $2 \times$ shorter than tepals; connate for more than half of their lengths, adnate

to perianth segments. Usefulness: For, Foo.

60. Allium fetisowii Regel

Synonyms: Allium simile Regel



Phytogeographical element: I-T

Habitat: Screes

Elevational range: 1400 - 1500

Flowering period: V

Remarks: Cryptophyte; plant 40–60 cm high; scape ribbed; leaves 1–2(–3); pedicels 2–3 \times longer than perianth; perianth stellately spreading; filaments of inner stamens 2–3 \times wider at base than outer; ovary minutely

tuberculate.

















61. Allium galanthum Kar. & Kir.



Phytogeographical element: EI-T, E-S

Habitat: Screes, rocks Elevational range: 500 - 1500 Flowering period: VIII - X

Remarks: Cryptophyte; plant (20–) 30–60 cm high; bulbs cylindric; scape solid; leaves fistular; filaments usually slightly longer than perianth segments; filaments of inner

stamens 2-toothed.

62. Allium hissaricum Vved.



Phytogeographical element: E, I-T

Habitat: Forbs

Elevational range: 1100 - 2200 Flowering period: V - VII

Remarks: Cryptophyte; plant (10–)20–40(–50) cm high, with single leaf; filaments shorter than perianth, connate for 1/2–3/5 their length, adnate to perianth segments.

63. Allium hymenorhizum Ledeb.



Phytogeographical element: I-T, E-S

Habitat: Alpine swards, alpine steppes, moraines and

snow-beds

Elevational range: 2450 - 3800 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 15–50(–70) cm high; bulb cylindric, with red-brown, shiny tunic; leaves 3–4(–5), flat; filaments up to 1.5(–2) × longer than perianth.

64. Allium macleanii Baker

Synonyms: Allium elatum Regel, A. lucens E. Nikit.



Phytogeographical element: E, I-T

Habitat: Rocks, screes Elevational range: 1900 - 3500 Flowering period: VI - VII

Remarks: Cryptophyte; plant 50–100 cm high; leaves 2–4, obovate, 2–7 cm wide; umbel very dense; pedicels 4–8 \times longer than tepals; filaments longer than perianth.

65. Allium oreophilum C.A. Mey.



Phytogeographical element: I-T Habitat: Screes, alpine steppes Elevational range: 2500 - 3600 Flowering period: VI - VII

Remarks: Cryptophyte; plant 5–15 (–20) cm high; leaves 2, linear, longer than scape; tepals 7–11 mm long; filaments triangular, ca. $2 \times$ shorter than perianth, connate at base.

66. Allium oreoprasum Schrenk



Phytogeographical element: I-T

Habitat: Alpine swards, rocks, alpine steppes

Elevational range: 2700 - 3900

Flowering period: VIII

Remarks: Cryptophyte; plant 15–25 cm high; leaves 3-4(-5), narrowly linear; umbel few flowered; pedicels up to $2 \times longer$ than perianth; filaments shorter than tepals.



















67. Allium oschaninii O. Fedtsch.



Phytogeographical element: E, I-T

Habitat: Rocks, screes, xeric shrubs, thermophilous shrubs

Elevational range: 450 - 2400 Flowering period: VI - VII

Remarks: Cryptophyte; plant 45–80 cm high; scape swollen in lower part; inner and outer tepals distinctly differs in shape; filaments slightly longer than tepals; base of inner

filaments ca. $2 \times$ wider than base of tepals. Usefulness: Foo.

68. Allium sarawschanicum Regel



Phytogeographical element: E, I-T

Habitat: Juniper forests, broad-leaved forests, xeric shrubs

Elevational range: 1700 - 2200 Flowering period: VI - VII

Remarks: Cryptophyte; plant 25–60 cm high; scape ribbed; leaves 1–2; pedicels up to 2–4(–6) × longer than perianth; filaments slightly shorter than perianth; ovary with 6 outgrowths.

69. Allium schubertii Zucc.



Phytogeographical element: I-T Habitat: Deserts, steppes, forbs Elevational range: 400 - 1400

Flowering period: V

Remarks: Cryptophyte; plant (5–)10–30 cm high; leaves 2–5; pedicels distinctly unequal 3–15 cm long in sterile and 2–10 cm long in fertile flowers), apex (especially during fruiting) thickened; filamets distinctly shorter than tepals.

Usefulness: Orn.

70. Allium setifolium Schrenk



Phytogeographical element: EI-T Habitat: Screes, semi-deserts Elevational range: 400 - 1200 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 5–10 cm high; bulb tunic pale brown, with apex laciniate; leaves 2–3, hairlike, shorter or subequal to scape; umbel few flowered; filaments shorter than tepals.

71. Allium stipitatum Regel



Phytogeographical element: SE, I-T Habitat: Juniper forests, forbs Elevational range: 900 - 3300 Flowering period: V - VI

Remarks: Cryptophyte; plant 50–120 cm high; leaves 4–6, especially in lower part pilose; perianth stellately spreading; filaments as long as tepals, at base connate, adnate to perianth segments; ovary shortly stipitate. Usefulness: Foo.

72. Allium tianschanicum Rupr.



Phytogeographical element: EI-T

Habitat: Rocks, alpine semi-deserts, alpine steppes

Elevational range: 2800 - 4000 Flowering period: VII - IX

Remarks: Cryptophyte; plant 15–25 cm high; leaves 3–4, solid, grooved, 1–1.5 mm wide; pedicels \pm /- as long as perianth; tepals ovate, inner slightly longer than outer; filaments up to 1.5 \times longer than tepals, connate at base, adnate to perianth segments.

















73. Allium verticillatum Regel



Phytogeographical element: SE, I-T Habitat: Steppes, thermophilous shrubs

Elevational range: 800 - 2200 Flowering period: V - VI

Remarks: Cryptophyte; plant 10–20 cm high; leaves 1–2, dissected up to the leaf sheats, consisted of filiform lobes; pedicels 3–8 × longer than perianth; filaments slightly longer than tepals; ovary scabrid.

74. Allium weschniakowii Regel



Phytogeographical element: EI-T

Habitat: Screes

Elevational range: 800 - 2000 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 10–15 cm high; bulbs cylindric; tunic membranous; leaves 3–4, pedicels 1.5–2 × longer than tepals, filaments connate into an urceolate

tube for 3/4–4/5 their length.

75. Allium winklerianum Regel



Phytogeographical element: I-T Habitat: Loose sandy screes Elevational range: 2300 - 3500 Flowering period: VI - VII

Remarks: Cryptophyte; plant 15–50 cm high; bulb globose; tunic blackish gray, papery; leaves 1–2; filaments 2 \times shorter than tepals, connate for 1/2–3/5 their length,

adnate to perianth segments.

75

76. Ungernia tadshicorum Vved. ex Artjush.



Phytogeographical element: E, I-T Habitat: Meadows, steppes Elevational range: 800 - 2200 Flowering period: VII - VIII

Remarks: Cryptophyte; plant (15–) 25–30 cm high; leaves 8–12, appear in early spring, wither from May to July; scape yellowish-green, appears in summer; umbel 7–17-flowered; pedicels unequal, 2–7 cm long (during fruitng up to 14 cm long); perianth lobes 3 × longer than tube.

Usefulness: Med, Orn.

77. Pistacia vera L.



Phytogeographical element: I-T Habitat: Thermophilous shrubs, forbs

Elevational range: 400 - 2000

Flowering period: IV

Remarks: megaphanerophyte; Tree 6–12 m tall leaves odd pinnate, leaflets 3–10 ovate to suborbiculate, with prominent nerves on the lower surface; drupe 12–30 mm

long, ovoid-oblong. Usefulness: Med, Foo, Orn.

78. Rhus coriaria L.



Phytogeographical element: I-T Habitat: Thermophilous shrubs Elevational range: 1000 - 1800

Flowering period: VI

Remarks: Nanophanerophyte; shrub 2–4 m high; branches pubescent; leaf blade imparipinnately compound, 10–23 cm, leaflets 8–15; male flowers in more lax inflorescences than female flowers.

Usefulness: Med, Foo.















79. Aegopodium tadshikorum Schischk.



Phytogeographical element: I-T

Habitat: Broad-leaved forests, alpine meadows

Elevational range: 600 - 2900 Flowering period: VI - VII

Remarks: Cryptophyte; plant 60–110 cm high; terminal leaf lobes broadly-lanceolate, sharply serrate; umbels 5–8

cm in diameter, with 9-20 rays.

80. Angelica archangelica L. subsp. decurrens (Ledeb.) Kuvaev.

Synonyms: Angelica komarovii (Schischk.) V. Tichomirov



Phytogeographical element: I-T

Habitat: Riverside forests, alpine meadows

Elevational range: 1800 - 3800 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 80–200 cm high; terminal leaf lobe sessile or sometimes with a short petiole.

Usefulness: Med, For.

81. Angelica brevicaulis (Rupr.) B. Fedtsch.



Phytogeographical element: I-T Habitat: River beds, meadows, screes Elevational range: 1600 - 3800 Flowering period: VI - VII

Remarks: Cryptophyte; plant 15–50 cm high with singular stem; terminal leaf lobe sessile or sometimes with a short

petiole.

82. Angelica ternata Regel & Schmalh.



Phytogeographical element: I-T Habitat: Alpine swards, screes Elevational range: 2100 - 3800 Flowering period: VI - VII

Remarks: Cryptophyte; plant 25-45 cm high; terminal leaf

lobe roundish in an outline, with a long petiole.

83. Anthriscus caucalis M. Bieb.

Synonyms: Caucalis scandicina Wigg.



Phytogeographical element: Plurireg Habitat: Screes, ruderal, fields, orchards

Elevational range: 500 - 1600 Flowering period: V - VII

Remarks: Therophyte; plant up to 80 cm high; fruits ca. 4–5 mm long, covered with hooked spines and tuft of

bristles at the base.

84. Aphanopleura capillifolia (Regel & Schmalh.) Lipsky



Phytogeographical element: I-T

Habitat: Deserts, thermophilous shrubs, forbs

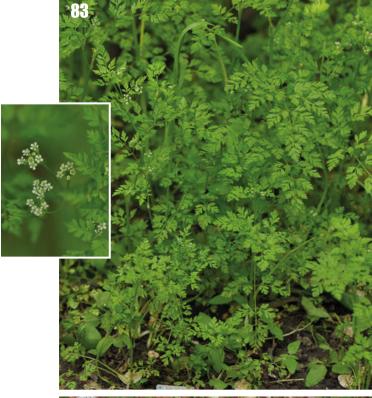
Elevational range: 400 - 2200 Flowering period: IV - V

Remarks: Therophyte; plant 7–12 (–30) cm high, glabrous;

basal leaves 2-pinnate or 2-ternate; bracts absent or

inconspicuous. Usefulness: Hou.













85. Apium nodiflorum (L.) Lag.

Synonyms: Helosciadium nodiflorum (L.) Koch



Phytogeographical element: Plurireg

Habitat: River beds

Elevational range: 400 - 1700 Flowering period: V - VI

Remarks: Cryptophyte; plant 15–40 cm high; at least lower part of stem procumbent, rooting at the nodes, the upper part of stem erect; leaf pinnate with lanceolate to ovate lobes; membranous leaf sheaths; involucel with 4–7 linear to ovate-lanceolate bractlets, often longer than umbellets.

86. Aulacospermum roseum Korovin



Phytogeographical element: SE, I-T

Habitat: Juniper forests, alpine swards, steppes

Elevational range: 1800 - 4000 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 20–60 cm high; stem hollow; flowers in compound umbels with 3–12 rays, white or pinkish; fruits slightly flattened, with no beak, fruit ribs with transversely folded wings so that hollows between them covered with warts.

87. Aulacospermum simplex Rupr.



Phytogeographical element: I-T Habitat: Forbs, alpine meadows Elevational range: 1700 - 3600 Flowering period: VII - IX

Remarks: Cryptophyte; plant 20–40 cm high, glabrous; stem solitary, ribbed; ultimate segments of leaves linear-lanceolate, 4–18 × 1–4 mm, acute; umbels 5–7 cm in diameter; bracts 4–7, lanceolate, 1–1.5 cm; rays 5–11, 1–5 cm, unequal; petals broad-ovate, purplish, margin white; anthers yellow-green; fruit broad-ovoid 3–4 × 2.5–3.5

mm; ribs all broadly sinuolate-winged.

88. Berula erecta (Huds.) Coville

Synonyms: Berula angustifolia (L.) Mert. & W.D.J. Koch



Phytogeographical element: Plurireg Habitat: River beds, littoral vegetation

Elevational range: 350 - 1650 Flowering period: VII

Remarks: Cryptophyte; plant 30–100 cm high; umbels with 8–20 rays, on short peduncles oriented perpendicularly to

leaves; fruits smooth, almost roundish.

89. Bunium angrenii Korovin



Phytogeographical element: E, I-T Habitat: Thermophilous shrubs Elevational range: 1200 - 2300 Flowering period: V - VI

Remarks: Cryptophyte; plant 20–40 cm high; terminate lobes of lower leaves linear, similar to upper leaves; involucre bracts absent; fruits elliptic with strong nice

smell.

90. Bunium capusii (Franch.) Korovin



Phytogeographical element: I-T

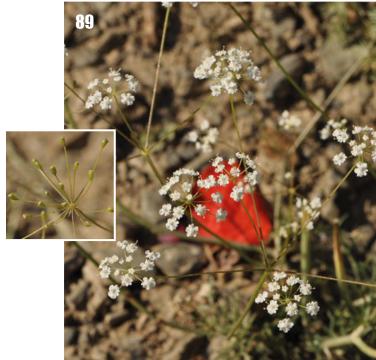
Habitat: Juniper forests, broad-leaved forests,

thermophilous shrubs Elevational range: 400 - 2500 Flowering period: IV - V

Remarks: Cryptophyte; plant 25–30 cm high; stem and leaves glabrous; umbel rays 6–12; stem leaves straight (not curved, nor forming angles); stylidium stright, pointing up; seeds ca. 5 mm long, with strong smell.

Usefulness: For.













91. Bunium hissaricum Korovin



Phytogeographical element: E, I-T

Habitat: Meadows, thermophilous shrubs, forbs

Elevational range: 500 - 1200

Flowering period: V

Remarks: Cryptophyte; plant 30–90 cm high, with intensive smell; stem leaves straight (not forming angles); terminate leaf lobes of basal leaves differ from the shape of terminal lobes of upper cauline leaves; involucre bracts absent; petals elliptical; stylodium curved towards mericarps; pedicels thin, filiform, up to 1.5 × lenght of a fruit; fruit lanceolate, easely separating into two mericarps.

92. Bunium persicum (Boiss.) B. Fedtsch.



Phytogeographical element: I-T

Habitat: Juniper forests, thermophilous shrubs, forbs

Elevational range: 800 - 3000 Flowering period: V - VI

Remarks: Cryptophyte; plant 30–60 cm high; rays 8–20; involucre absent or with 1–2 short bracts; petals 1 mm long; fruit pedicels thin, 5–10 mm long, 2–4 \times longer than

fruits; fruits oblong or oblong-linear, with smell.

Usefulness: Med, Foo.

93. Bupleurum densiflorum Rupr.



Phytogeographical element: I-T Habitat: Rocks, steppes Elevational range: 2800 - 3400 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 10–20 cm high; leaves lanceolate; umbel with 2–4 unequal rays and with 1–2

leaves.

94. Bupleurum falcatum L. subsp. cernuum (Ten.) Arcang.

Synonyms: Bupleurum exaltatum Bieb., B. kotschyanum Boiss.



Phytogeographical element: I-T Habitat: River beds, screes, steppes Elevational range: 1500 - 3600 Flowering period: VI - VII

Remarks: Cryptophyte; plant 50–125 cm high, shrubby; base woody; stems numerous rarely 1; basal and lower cauline leaves linear, rigid, up to 10 cm long, up to 5 mm broad; upper leaves similar, shorter; all leaves sessile; umbel with 3–5(–7) thin, unequal rays; involucre bracts 3–5 mm long, linear; involucel of 4–5 linear bractlets; fruit oblong, ca. 4.5 mm long.

Usefulness: For.

95. Bupleurum lipskyanum O.A. Lincz.



Phytogeographical element: E, I-T Habitat: River beds, steppes, xeric shrubs

Elevational range: 1500 - 3700 Flowering period: VI - VII

Remarks: Cryptophyte; plant 20–30 cm high; stems erect, woody at the base, thin in an upper part; rays closely arranged; involucre bracts 3–5, 2–3 mm long, enequal, lanceolate.

96. Caucalis platycarpos L.

Synonyms: Caucalis lappula Grande

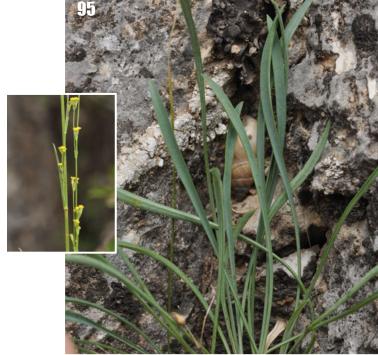


Phytogeographical element: Plurireg

Habitat: Fields, ruderal Elevational range: 350 - 1800 Flowering period: IV - VI

Remarks: Therophyte; plant up to 40 cm high, setosepilose; leaves divided into many small leaflets; umbel with 2–5 rays and 2–5 involucre bracts; petals white or pink; style 1.5–2 mm; fruit an oblong capsule with many hooked spines on the surface.















97. Cephalopodum badachshanicum Korovin



Phytogeographical element: E, I-T

Habitat: Rocks, screes

Elevational range: 1600 - 2200

Flowering period: VI

Remarks: Cryptophyte; plant up to 1.5–1.7 m high; leaf blade up to 24–40 cm long, deltoid in an outline, 3-pinnate; terminal leaf lobes linear, up to 5 mm long; umbels numerous, with 19–26 rays; umbellets with 25–30

flowers.

98. Conioselinum schugnanicum B. Fedtsch.



Phytogeographical element: I-T

Habitat: Broad-leaved forests, alpine meadows, steppes,

xeric shrubs, thermophilous shrubs, forbs

Elevational range: 1500 - 3900 Flowering period: VII - VIII

Remarks: Cryptophyte; plant up to 700 cm high; cauline leaves petiolate; petioles 4–6 cm, blade triangular-ovate; terminal leaf lobe apex acute, leaf margins acutely serrate; umbels with 4–10 rays; involucres with 3–7 bracts

dropping out early Usefulness: Med.

99. Conium maculatum L.



Phytogeographical element: A; Plurireg

Habitat: Broad-leaved forests, thermophilous shrubs, forbs

Elevational range: 600 - 2000 Flowering period: V - VII

Remarks: Hemicryptophyte; plant up to 150 cm high, stem not empty, speckled; umbels with unequal 10–20 rays; bracts and bractlets present; fruit ca. 3 mm, ovate.

96

Apiaceae

100. Coriandrum sativum L.



Phytogeographical element: A; Plurireg

Habitat: Ruderal

Elevational range: 550 - 2650 Flowering period: VI - VII

Remarks: Therophyte, hemicryptophyte; plant up to 70 cm high; basal and lower leaves 2-3-pinnatisect; petiole up to 13 cm long, blade ovate, toothed or incised; peduncles 2-10 cm; 2-8 rays, 2–5 linear, entire bracteoles; umbellets with 3–9 flowers; pedicels 2-5 mm; calyx teeth ovate-deltoid or ovate-lanceolate, unequal (two on the outer side enlarged compared to three

others); outer petals enlarged.

Usefulness: Med, Foo.

101. Cuminum setifolium (Boiss.) Koso-Pol.

Synonyms: Psammogeton setifolium Boiss.



Phytogeographical element: I-T

Habitat: Semi-deserts, fields, salt marshes, thermophilous

shrubs

Elevational range: 350 - 1500 Flowering period: IV - V

Remarks: Therophyte; plant 5-25 cm high; fruits with distinct,

long and soft white hairs.

Usefulness: Foo.

102. Dimorphosciadium gayoides (Regel & Schmalh.) Pimenov

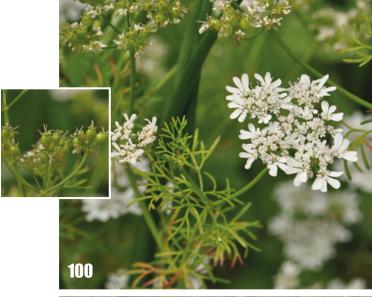
Synonyms: Pachypleurum gayoides (Regel & Schmalh.) Schischk.



Phytogeographical element: SE, I-T

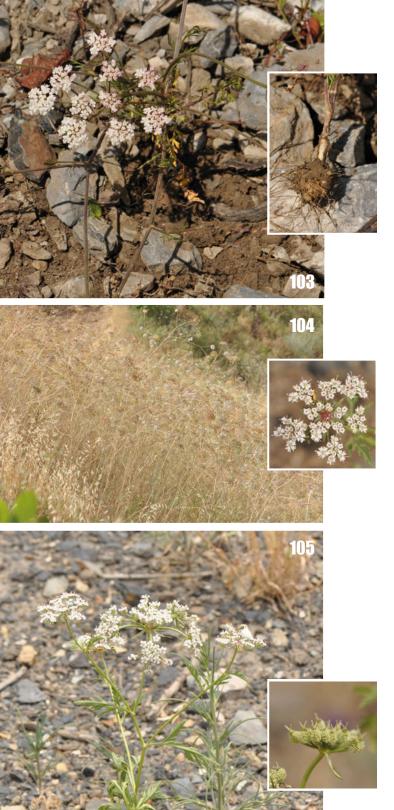
Habitat: Alpine steppes Elevational range: 4000 - 4000 Flowering period: VIII

Remarks: Cryptophyte; plant 10–15 cm high; stem strongly shortened; umbels differentiated i.e; large, central umbel located close to a ground, with 15 splayed rays of the lenght of 1-1.5 cm, other umbels smaller, compact, sterile, on long leafless peduncles growing from a basal leaf rosette.









103. Elaeosticta hirtula (Regel & Schmalh.) Kljuykov, Pimenov & V.N. Tikhom.

Synonyms: Scaligeria hirtula Lipsky, S. korshinskyi Korovin, S. oedihasioides Kamelin



Phytogeographical element: I-T

Habitat: Juniper forests, broad-leaved forests, alpine meadows, deserts, steppes, thermophilous shrubs, forbs

Elevational range: 500 - 3200 Flowering period: V - VI

Remarks: Cryptophyte; plant (16–) 20–40(–120) cm high; caudex eliptic to ovate; plant without intensive smell; upper cauline leave present; ultimate leaf lobe lanceolate or ovate; involucre bracts and involucel bractlets not tightly adhered to rays after flowering; pedicels up to 4.5 mm long; petals white; central umbel larger than others; fruit glabrous, eliptic or ovate. Usefulness: For.

104. Elaeosticta polycarpa (Korovin) Kljuykov, Pimenov & V.N. Tikhom.

Synonyms: Scaligeria polycarpa Korovin



Phytogeographical element: I-T Habitat: Pastures, steppes Elevational range: 650 - 1400 Flowering period: V - VI

Remarks: Cryptophyte; plant 50–110 cm high; upper cauline leaves reduced to leaf sheaths; terminal leaf lobe linear, acute; umbels with 25–40 rays; central umbel larger than others; petals white; fruit 1–1.3 mm long, nearly globular.

105. Eremodaucus lehmannii Bunge



Phytogeographical element: I-T

Habitat: Broad-leaved forests, fields, thermophilous shrubs, forbs

Elevational range: 400 - 2600 Flowering period: IV - V

Remarks: Therophyte; plant up to 30 cm high; leaves widely ovate, 2–3-pinnate; umbel with 10–15 rays with fleshy-like outgrowth in the centre; outer pedicels pendent; fruits ovate,

4.5–5 mm wide with warts.

Usefulness: For.

106. Eryngium caeruleum M. Bieb.

Synonyms: Eryngium caucasicum Trautv., E. pskemense Pavlov



Phytogeographical element: I-T

Habitat: Broad-leaved forests, orchards and gardens, fields,

thermophilous shrubs, forbs Elevational range: 500 - 2200 Flowering period: VI

Remarks: Cryptophyte, hemicryptophyte; plant up to 50 cm high; head (capitulum) up to 1 cm in diameter.

107. Eryngium macrocalyx Schrenk

Synonyms: Eryngium incognitum Pavlov



Phytogeographical element: I-T

Habitat: Juniper forests, broad-leaved forests,

thermophilous shrubs, forbs Elevational range: 700 - 2800 Flowering period: VI - VII

Remarks: Cryptophyte, hemicryptophyte; plant up to 1–1.7

m high; head (capitulum) 1.5–2 cm in diameter.

108. Ferula bucharica (Lipsky) Koso-Pol.

Synonyms: Ladyginia bucharica Lipsky

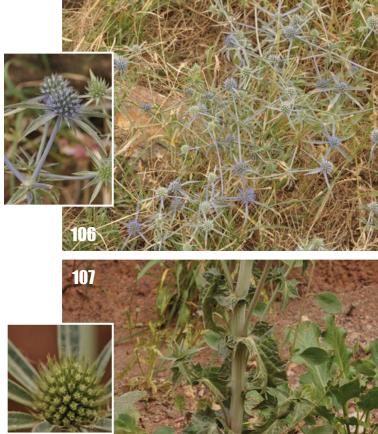


Phytogeographical element: I-T

Habitat: Juniper forests, loose sandy screes, screes, xeric

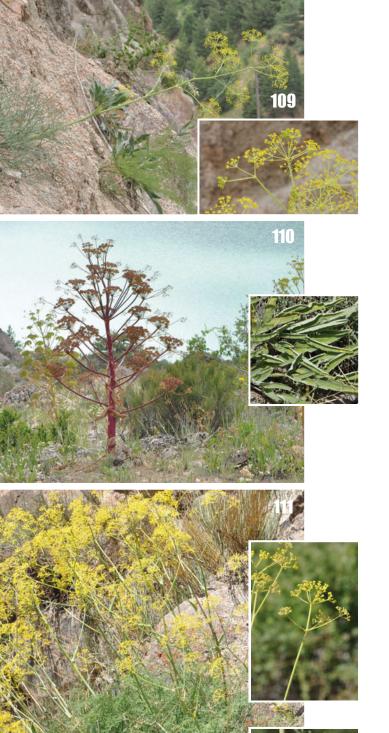
shrubs, thermophilous shrubs Elevational range: 700 - 1800 Flowering period: IV - V

Remarks: Cryptophyte; plant 50–60 cm high; leaves bi-3-pinnate, fleshy, glabrous on upper side, pubescent on lower side along veins; petals pubescent; fruit pubescent.









109. Ferula equisetacea Koso-Pol.



Phytogeographical element: E, I-T Habitat: Loose sandy screes, screes Elevational range: 1300 - 2500 Flowering period: VI - VII

Remarks: Cryptophyte; plant ca. 100 cm high; policarpic; glabrous; stem thickened; leaf-sheaths not inflated and not amplexicaul, perpendicularly attached to the stem; leaf hard, leathery, tripinnate; terminal leaf lobe cylindrical, up to 15 cm long, with entire margin and acute apex; compound umbels (one central and several lateral) on relatively short peduncles form inflorescence of elliptical shape; petals yellow; fruit 15 × 8 mm. Usefulness: Med.

110. Ferula foetidissima Regel & Schmalh.



Phytogeographical element: I-T

Habitat: Juniper forests, screes, steppes, thermophilous shrubs, forbs

Elevational range: 1200 - 2300 Flowering period: IV - V

Remarks: Cryptophyte; plant up to 1.5 m high, with garlic smell; terminal leaf lobes up to 12 cm long and 3–5 cm wide, densely pubescent, particularly on abaxial side; umbellets with 20 flowers without involucel; fruits 1.2–1.5 cm long, 6–7 mm wide. Usefulness: For.

111. Ferula karategina Lipsky ex Korovin



Phytogeographical element: E, I-T

Habitat: Broad-leaved forests, loose sandy screes, xeric shrubs, forbs

Elevational range: 1800 - 3500 Flowering period: VI - VII

Remarks: Cryptophyte; plant up to 50 cm high; policarpic; glabrous; 1–3 slender stems; leaf sheaths perpendicular to the stem, slightly inflated; leaf stiff, pinnate; terminal leaf lobe linear-lanceolate, up to 0.5 cm long, acute, usually 3-tooothed at the apex, with entire margin on lateral sides; central umbel with 5–10 rays, lateral umbels with long peduncles; petals yellow, 0.8–1 mm long, lanceolate, acute.

Usefulness: Hou.

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112. Ferula karelinii Bunge

Synonyms: Schumannia karelinii (Bunge) Korov.



Phytogeographical element: I-T Habitat: River beds, deserts Elevational range: 350 - 550 Flowering period: IV

Remarks: Cryptophyte; plant 25–40 cm high; leaves 2–3-pinnate with linear terminal lobes; fruits villous.

Usefulness: Med, For, Foo.

113. Ferula kokanica Regel & Schmalh.



Phytogeographical element: I-T

Habitat: Juniper forests, steppes, thermophilous shrubs, forbs

iords

Elevational range: 1300 - 3600 Flowering period: V - VI

Remarks: Cryptophyte; plant ca. 1 m high; leaves slightly pubescent on abaxial surface; terminal lobes 7–9 cm long, 2–3 cm wide, segments oblong-eliptic to ovate, with

obtuse or serrate apex; petals yellow.

Usefulness: Med.

114. Ferula kuhistanica Korovin



Phytogeographical element: I-T

Habitat: Screes, xeric shrubs, thermophilous shrubs

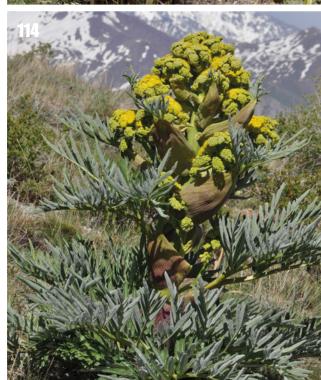
Elevational range: 900 - 3500 Flowering period: V - VI

Remarks: Cryptophyte; plant up to 1.7 m high; monocarpic; glabrous, with strong turpentine smell; stems cylidrical, up to 9 cm in diameter near the base, reddish-brownish, not inflated at nodes; leaf up to 1 m long and 0.7 m wide; terminal leaf-lobe up to 15 cm long, 5 cm wide; umbels compound; involucel bractlets absent; petals yellow; stylopodium flat, thickened at the margin; fruit 2.5–3 cm long.

Usefulness: Med, For, Foo, Hou.



















115. Ferula lithophila Pimenov

Synonyms: Peucedanum mogoltavicum Korovin



Phytogeographical element: E, I-T

Habitat: Rocks

Elevational range: 900 - 1200 Flowering period: V - VI

Remarks: Cryptophyte; plant 1.5–1.7 m high; monocarpic; glabrous (only petioles sometimes shortly pubescent); stem slender, near the base many petioles of dead leaves; basal leaves 4-pinnate, terminal leaf lobe up to 5 cm long and 2 mm wide, linear, bluish, fleshy; cauline leaves reduced to amplexicaul leaf-sheaths; umbels compound, with 5 rays; petals yellow.

116. Ferula moschata (H. Reinsch) Koso-Pol.

Synonyms: Ferula sumbul (Kauffm.) Hook. fil.



Phytogeographical element: E, I-T

Habitat: Juniper forests, broad-leaved forests, alpine meadows,

forbs

Elevational range: 1700 - 2500 Flowering period: VI - VII

Remarks: Cryptophyte; plant 1–1.5 m high; stem not inflated at nodes; terminal leaflets 2–3 cm long, 1–1.5 cm wide; umbellets with 10–15 flowers; involucel bractlets minute linear; fruits up to

7 mm long, 3-4 mm wide.

Usefulness: Med.

117. Ferula ovina (Boiss.) Boiss.

Synonyms: Ferula microcarpa Korovin, F. pachycarpa Korovin ex Pavlov, F. stylosa Korovin



Phytogeographical element: I-T

Habitat: Juniper forests, thermophilous shrubs, forbs

Elevational range: 1200 - 2800 Flowering period: V - VI

Remarks: Cryptophyte; plant ca. 50 cm high; policarpic; caudex branched, several stems; leaf 3-pinnate, rough and stiff, on both sides or only on bottom side hirsute; terminal leaf lobe 0.5–1(–1.5) cm long, elliptical to narrowly lanceolate, dentate, with parralel veins; umbels compound, with 3–10 rays; petals yellow; calyx with short teeth; fruit 0.7–1 cm long.

Usefulness: For.

118. Ferula samarkandica Korovin



Phytogeographical element: SE, I-T

Habitat: Juniper forests, steppes, thermophilous shrubs, forbs

Elevational range: 700 - 2900 Flowering period: V - VI

Remarks: Cryptophyte; plant up to 100 cm high; terminal leaflets up to 1 cm long, hispid, shiny; umbellets with involucels.

119. Ferula tadshikorum Pimenov



Phytogeographical element: E, I-T, E-S

Habitat: Steppes, xeric shrubs, thermophilous shrubs

Elevational range: 400 - 1800 Flowering period: IV - V

Remarks: Cryptophyte; plant 1.5–1.8 m high, with garlic smell; umbel with 20–30 rays; terminal leaf lobes up to 20 cm long × 7–9 cm wide, almost glabrous on adaxial and pubescent on abaxial side; fruits 1.5–2 cm long × 0.8–1 cm wide.

Usefulness: For, Foo.

120. Ferula violacea Korovin

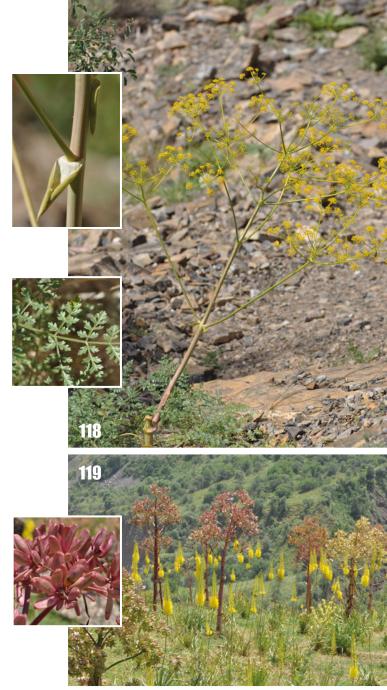


Phytogeographical element: E, I-T

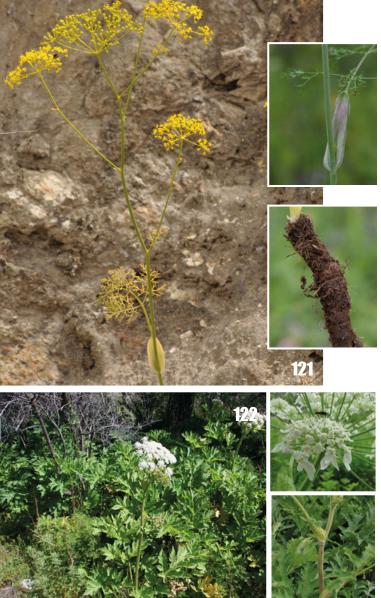
Habitat: Steppes, xeric shrubs, thermophilous shrubs

Elevational range: 1000 - 1900 Flowering period: V - VI

Remarks: Cryptophyte; plant 1–1.5 m high; monocarpic; with garlic smell; stems solid, cylindrical, not inflated at the base, neither in the nodes; leaves 3-pinnate, pale green, pubescent on both sides or only at the bottom, terminal leaf-lobe 3–4 cm long, 1–1.5 cm wide; umbels compound, with 10–16 rays; incvolucel bractlets absent; petals yellow, glabrous; singular sectretory ducts in mericarp hollows; fruits 1.3–1.7 cm long, 5–7 mm wide.









121. Galagania ferganensis (Korovin) M.G. Vassiljeva & Pimenov

Synonyms: Korovinia ferganensis Korovin, Eulophus ferganensis (Korovin) M. Hiroe



Phytogeographical element: I-T Habitat: Steppes, xeric shrubs Elevational range: 1100 - 2300 Flowering period: VI - VII

Remarks: Cryptophyte; plant 40–60 cm high; glabrous; leaves tripinnate, short-lived; basal leaves in rosette, with long petioles with enlarged bases; cauline leaves with short petioles (or sessile) and lanceolate, leathery and shiny, aplexicaulous sheaths; terminal leaf lobe 0.5–1 cm long; umbels with 10–20 rays; fruits strongly compressed, ovate or oblong-elliptical, marginal ribs narrowly winged, on a cross-section sclerenchyma is well visible.

122. Heracleum lehmannianum Bunge



Phytogeographical element: SE, I-T Habitat: River beds, fens and mires, forbs

Elevational range: 1500 - 3000 Flowering period: VII - VIII

Remarks: Cryptophyte; plant up to 3 m high; monocarpic; stem hollow, sulcate, hairy; leaves glabrous on the upper side, pubescent at the bottom side; umbels compound with up to 50 rays; ray up to 15 cm long; petals white or pinkish-white; marginal petals twice as larg as inner ones; fruit 9–10 mm long, elliptical to obovate.

123. Heracleum olgae Regel & Schmalh.

Synonyms: Tetrataenium olgae (Regel & Schmalh.) Manden.



Phytogeographical element: I-T

Habitat: Screes

Elevational range: 1600 - 3500 Flowering period: VII - VIII

Remarks: Cryptophyte; plant up to 1 m high; leaves ovate, usually 3-lobed; fruits flattened with unequal ribs, pubescent.

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124. Hymenolaena badachschanica Pissjauk.



Phytogeographical element: SE, I-T

Habitat: River beds, semi-deserts, alpine steppes

Elevational range: 2400 - 4600 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 20–40 cm high; leaf lobes serrate with a minute whitish spike; involucel bractlets with short lateral

veins towards central vein.

125. Kafirnigania hissarica (Korovin) Kamelin & Kinzik.

Synonyms: Peucedanum hissaricum Korovin



Phytogeographical element: E, I-T

Habitat: Rocks

Elevational range: 1400 - 1900 Flowering period: VI - VII

Remarks: Cryptophyte; plant 50–80 cm high; policarpic; several stems; stem slightly sulcate; leaf glabrous, 4-pinnate, dark–green with bluish coating; terminal leaf lobes narrowly linear 1.5–6 cm long, 0.5–0.8 mm wide, acute; compound umbels with 20–30 rays; involucre bracts absent; involucel bractlets linnear 2 mm long; petals light yellow, nearly white; fruits 4–5 mm long, 2.5 mm wide, glabrous; marginal ribs of mericarps widely winged.

126. Korovinia tenuisecta (Regel & Schmalh.) Nevski & Vved.

Synonyms: Galagania tenuisecta (Regel & Schmalh.) M. Vassil. & M. Pimen.



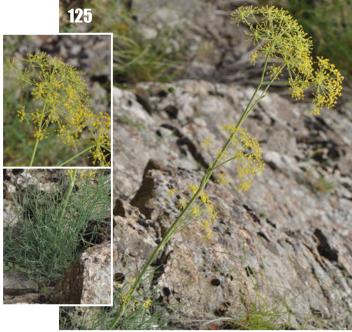
Phytogeographical element: I-T Habitat: Steppes, xeric shrubs Elevational range: 600 - 1400 Flowering period: IV - VI

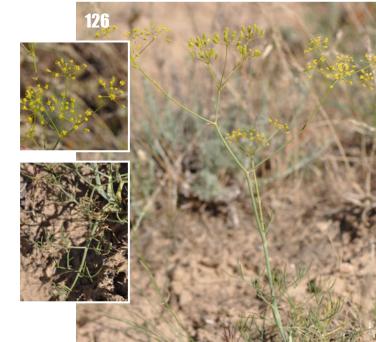
Remarks: Cryptophyte; plant 40–60 cm high; glabrous; stem with whitish stripes; basal leaves in rosette, with short petioles and narrow sheaths; cauline leaves with lanceolate, leathery and shiny, aplexicaulous sheaths; terminal leaf lobe 1–3 cm long and 0.4–0.6 mm wide; umbels with 5–10 rays; fruits strongly compressed, obovate or oblong-elliptical, marginal ribs widely winged, on a cross-section of mericarp aerechyma is well visible.

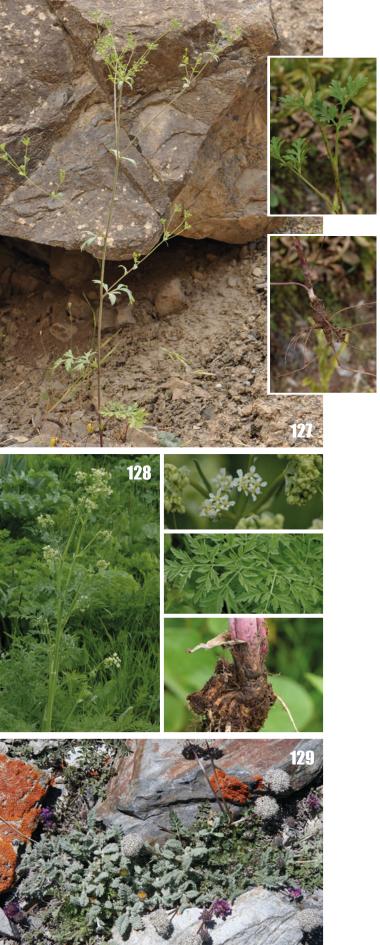
Apiaceae











127. Korshinskya olgae Lipsky



Phytogeographical element: E, I-T

Habitat: Juniper forests, broad-leaved forests, steppes,

thermophilous shrubs, forbs Elevational range: 900 - 3000 Flowering period: VI - VII

Remarks: Cryptophyte; plant $50-100~\rm cm$ high, glabrous; roots tuberous; stem violet at the bottom; basal leaf-blade $10-12~\rm cm$ long, pinnate; terminal leaf-lobe $5\times1.5~\rm mm$, lanceloate; umbels compound; central umbel much larger than lateral ones, with $11-20~\rm rays$; whole inflorescence of corymbose form; $3-4~\rm large$ invulucre bracts; petals greenish-yellow; seed $2.9-3.8~\rm mm$ long, glabrous, shiny, not winged.

128. Anthriscus glacialis Lipsky



Phytogeographical element: I-T Habitat: Forbs, alpine meadows Elevational range: 1800 - 3300 Flowering period: VI - VII

Remarks: Cryptophyte; plant up to 2 m high; monocarpic; vertical root; caudex thickened; stem singular, glabrous, hollow, ca. 1 cm in diameter; leaf glabrous ca. 30×17 cm, the terminal sections 2-5 cm, hirsute on both sides; umbels ca. 5 cm wide with 7-12 rays; seed 6×2 mm.

129. Lomatocarpa albomarginata (Schrenk ex Fisch. & C.A. Mey.) Pimenov & Lavrova

Synonyms: Alposelinum albomarginatum (Schrenk) M. Pimen., Neogaya simplex (L.) Meisn. var. albomarginata Schrenk ex Fisch. & C.A. Mey.



Phytogeographical element: I-T

Habitat: Juniper forests, alpine meadows, screes, steppes

Elevational range: 1800 - 3600

Flowering period: VII

Remarks: Cryptophyte; plant ca. 20 cm high; basal leaves in a rosette; single secretory canals in hollows.

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130. Mediasia macrophylla (Regel & Schmalh.) Pimenov

Synonyms: Seseli macrophyllum Regel & Schmalh.



Phytogeographical element: SE, I-T

Habitat: Juniper forests, screes, steppes, thermophilous shrubs, forbs

Elevational range: 1300 - 2800 Flowering period: VI - VIII

Remarks: Cryptophyte; plant up to 1.5 m high; stems solid;

fruits pubescent. Usefulness: Foo.

131. Oedibasis apiculata (Kar. & Kir.) Koso-Pol.

Synonyms: Ferula polyantha Korovin, Peucedanum polyanthum Korovin



Phytogeographical element: SE, I-T

Habitat: Screes, steppes Elevational range: 350 - 1600 Flowering period: IV - V

Remarks: Cryptophyte; plant 30–40 cm high; solitary stem with branches in upper part; leaf fleshy, leathery; leaf lobes with

dentate margin; umbel with (5-)11-18(-30) rays.

132. Pilopleura tordyloides Pimenov

Synonyms: Zosima tordyloides Korov.



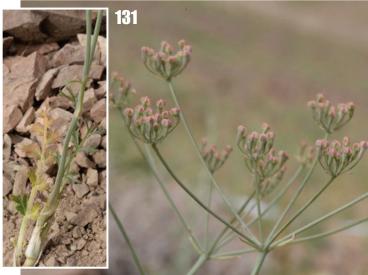
Phytogeographical element: I-T

Habitat: Screes

Elevational range: 2500 - 2900 Flowering period: VII - VIII

Remarks: Cryptophyte; plant up to 60 cm high; stem (1, rarely 2) angular, ribbed, glabrous; basal leaves with oblong blade, glabrous or sparsely pubescent, 2–3-pinnately dissected, 8–12 × 2.5–5 cm; umbels 2.5–4 cm in diameter, rays 15–20, pubescent, ribbed; involucre bracts lanceolate, with membraneous margin, almost as long as rays; involucels longer than umbellet; petals whitish; stylopodium conic; fruit ovoid, 4 × 2.8 mm, minutely pubescent or glabrous.













133. Pimpinella puberula (DC.) Boiss.



Phytogeographical element: I-T

Habitat: Rocks, loose sandy screes, thermophilous shrubs

Elevational range: 600 - 1200 Flowering period: V - VI

Remarks: Therophyte; plant 25–50 cm high; plant puberulent; stem branched dichotomously nearly from the base; basal leaves entire, orbicular, ca. 2 cm in diamater; cauline leaves 1–2-pinnate; umbel compound, with 5–14 rays; involucre and involucel bracts absent; fruit strongly laterally compressed, covered with long trichomes curved at the ends.

134. Prangos bucharica B. Fedtsch.

Synonyms: Cachrys bucharica (O.Fedtsch.) Herrnst. & Heyn



Phytogeographical element: I-T Habitat: Meadows, steppes Elevational range: 400 - 2400 Flowering period: IV - V

Remarks: Cryptophyte; plant 30–60 cm high; stem glabrous or slightly pubescent; leaves glabrous; terminal leaf lobes 0.5–1 (–1.4) cm long, 1 mm wide; fruit spherical or elliptical; grooves between mericarp ribs wide, flat, without papillary structures.

135. Prangos didyma (Regel) Pimenov & V.N. Tikhom.

Synonyms: Cachrys didyma Regel, Cryptodiscus didymus (Regel) Korov, Neocryptodiscus didymus (Regel) Hedge & Lamond



Phytogeographical element: I-T Habitat: Thermophilous shrubs, forbs

Elevational range: 400 - 500 Flowering period: IV - VI

Remarks: Cryptophyte; plant 40–60 cm high; stem hispid, especially below; leaf 3–4-pinnate; ultimate leaf segment linear-lanceolate, $3-8\times0.5-1.2$ mm, entire, hispid; umbels with 4–6 rays; petals white, ca. 1.5 mm long, hispid abaxiall; fruit subspherical $5-9\times6-10$ mm, ribs all inconspicuous.

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136. Prangos fedtschenkoi (Regel & Schmalh.) Korovin



Phytogeographical element: SE, I-T

Habitat: Juniper forests, thermophilous shrubs, forbs

Elevational range: 600 - 2300 Flowering period: V - VI

Remarks: Cryptophyte; plant with stem 50–80 cm high; stem covered with small warts; umbels with 5–10 rays; grooves between mericarp ribs with papillary structures.

Usefulness: For.

137. Prangos pabularia Lindl.

Synonyms: Koelzella pabularia (Lindl.) Hiro



Phytogeographical element: I-T

Habitat: Cushion semi-deserts, steppes, thermophilous

shrubs

Elevational range: 800 - 3500 Flowering period: VI - VII

Remarks: Cryptophyte; plant ca. 1 m high; leaves glabrous or papillose, 4–6-pinnate; segments filiform to linear, 1–3 cm long; umbels with 10–20 rays; petals yellow; fruit oblong, 1–1.5 cm long, grooves between mericarp ribs with papillary structures; mericarp ridges broad, undulate. Usefulness: Med, For.

138. Scandix pecten-veneris L.



Phytogeographical element: I-T, M, E-S

Habitat: Broad-leaved forests, deserts, thermophilous

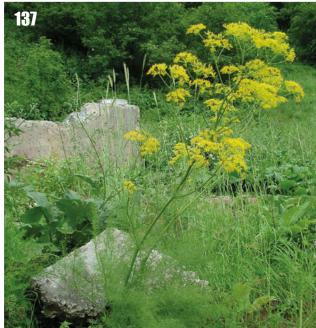
shrubs, forbs

Elevational range: 400 - 2500 Flowering period: III - IV

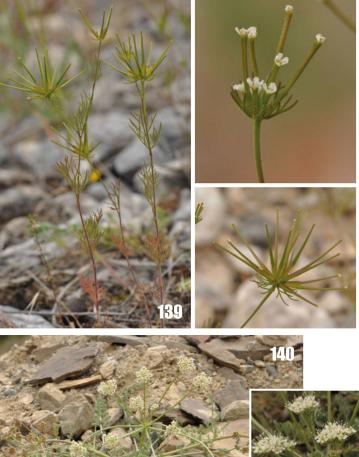
Remarks: Therophyte; plant 10–30 cm high; involucel bractlets simple or bilobed; flowers and fruits shortly

pedicellate; fruits 2.5–3 cm long.













139. Scandix stellata Banks & Sol.

Synonyms: Scandix fedtschenkoana Koso-Pol.



Phytogeographical element: I-T

Habitat: Loose sandy screes, screes, fields

Elevational range: 500 - 3700 Flowering period: IV - VI

Remarks: Therophyte; plant 15-40 cm high; involucel bractlets pinnately divided; flowers and fruits sessile; fruits 1.5-2.5 cm

140. Schrenkia golickeana B. Fedtsch.



Phytogeographical element: I-T

Habitat: Juniper forests, steppes, thermophilous shrubs, forbs

Elevational range: 1200 - 3400 Flowering period: IV - VI

Remarks: Cryptophyte; plant 10-15(-35) cm high; stem deeply sulcate, leaves pinnate-pinnatisect, without leaf sheaths; umbels compound; involucre bracts pinnatisect; petals white, broadly ovate; fruit biglobose (didymous), broader than long, 3.5-4 mm wide, hairy, with slightly conspicuous ribs covered with scarce papillae and powder coating.

Usefulness: Med.

141. Schrenkia vaginata (Ledeb.) Fisch. & C.A. Mev.

Synonyms: Schrenkia mogoltavica O. Politova



Phytogeographical element: I-T

Habitat: Juniper forests, steppes, thermophilous shrubs, forbs

Elevational range: 1100 - 3000 Flowering period: V - VI

Remarks: Cryptophyte; plant 30-45 cm high; stem finely sulcate, leaves 2-4-pinnate-pinnatisect, with well developed sheaths; umbels compound; involucre bracts entire, often absent; petals white, oblong to ovate; fruit biglobose (didymous), broader than long, glabrous, covered only with papillaes.

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142. Schtschurowskia meifolia Regel & Schmalh.



Phytogeographical element: SE, I-T Habitat: Juniper forests Elevational range: 2400 - 3300

Flowering period: VI - IX

Remarks: Cryptophyte; plant up to 30 cm high; only central flower fertile in umbels; calyx teeth soft; fruit roundish-ovate, with smooth longitudinal ridges.

143. Schulzia albiflora (Kar. & Kir.) Popov



Phytogeographical element: EI-T Habitat: Salt marshes, alpine steppes Elevational range: 3200 - 4600 Flowering period: VII - IX

Remarks: Cryptophyte; plant 10–20(–45)cm high; root vertical, 1 cm in diameter; stem often reduced; leaves 3-pinnate, involucre of numerous 2-pinnate bracts; involucel similar to involucre; rays 15–30; fruit up to 3 cm

long, 1 mm wide.

144. Semenovia dasycarpa (Regel & Schmalh.) Korovin

Synonyms: *Malabaila dasycarpa* (Regel & Schmalh.) Schischk., *Pastinaca dasycarpa* Regel & Schmalh.



Phytogeographical element: I-T

Habitat: Meadows, fens and mires, rocks, steppes

Elevational range: 1800 - 3400 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 40–70 cm high; base of the stem with tufted, soft remnants of petioles of dead basal leaves; leaf segments 3–7 cm long, 2.5–5 cm wide, broadly ovate or nearly orbicular, 2–3-lobed, sparsely pubescent or glabrous; calyx with short, triangular teeth; petals yellowish, white or pink, outer longer than inner; style up to 1.5 mm.



















145. Semenovia heterodonta Manden.

Synonyms: Platytaenia heterodonta Korovin



Phytogeographical element: E, I-T

Habitat: Rocks, loose sandy screes, screes, steppes

Elevational range: 2200 - 4300

Flowering period: VII

Remarks: Cryptophyte; plant up to 40 cm high; base of the stem with tufted, soft remnants of petioles of dead basal leaves; usually many stems; stem and both sides of leaves pubescent; umbels compound; rays 4–6; petals yellowish, unequal; calyx teeth unequal.

146. Semenovia pamirica (Lipsky) Manden.



Phytogeographical element: E, I-T

Habitat: Rocks, loose sandy screes, screes, semi-deserts

Elevational range: 3100 - 4300

Flowering period: VII

Remarks: Cryptophyte; Plant 20–40 cm high; base of the stem with rigid, often present hard remnants of petioles of dead basal leaves; caudex strongly branched, often woody; several stems; stem pubescent, extensively branched; leaf segments oblong–linear; spherical inflorescence; umbels compound with 3–6 rays; petals light yellow, sometimes violet at the base.

147. Semenovia pimpinelloides (Nevski) Manden.

Synonyms: Neoplatytaenia pimpinelloides (Nevski) Geld., Platytaenia pimpinelloides Nevski, Zosima pimpinelloides (Nevski) M. Hiroe



Phytogeographical element: E, I-T

Habitat: Alpine swards, rocks, moraines and snow-beds

Elevational range: 2300 - 3200

Flowering period: VII

Remarks: Cryptophyte; plant 40–60 cm high; base of the stem with tufted, soft remnants of petioles of dead basal leaves; lateral leaf segments oval or ovate, 8–10 mm in diameter, apical segment up to 15 mm long, 20 mm wide; umbels with 2–6 rays; calyx teeth equal; petals yellowish.

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148. Semenovia transiliensis Regel & Herder

Synonyms: Heracleum transiliense (Regel & Herder) O. Fedtsch. & B. Fedtsch.



Phytogeographical element: EI-T Habitat: Alpine meadows Elevational range: 1700 - 3200 Flowering period: VII - IX

Remarks: Cryptophyte; plant 20-60 cm high with slender, branching stem; basal leaves pinnate, broad-ovate, $2-3 \times$ 1-2 cm; bracts 3-5, linear; rays 4-15, subequal, 3-4 cm, densely hairy with spreading hairs; bractlets 3–5, linear, nearly as long as umbellet; flowers 15-20 per umbellet; fruit ovoid, $6-8 \times 4-5$ mm, pilose; lateral ribs broadly winged.

149. Seseli mucronatum (Schrenk) Pimenov & Sdobnina

Synonyms: Ligusticum mucronatum (Schrenk ex Fisch. & C.A. Mey.) Leute, Pachypleurum mucronatum (Schrenk ex Fisch. & C.A. Mey.) Schischk.



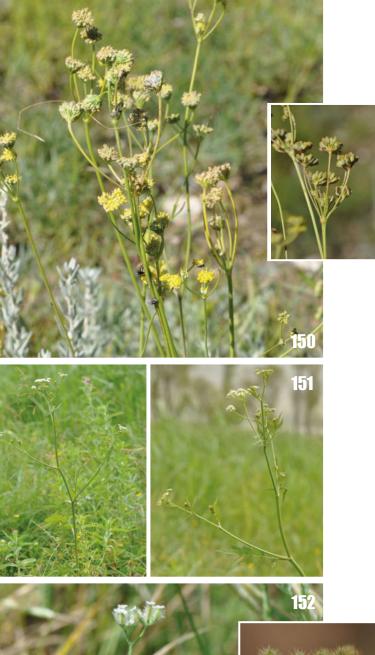
Phytogeographical element: I-T Habitat: Meadows, fens and mires Elevational range: 1500 - 3800 Flowering period: VI - VII

Remarks: Cryptophyte; plant 40-50 cm high; policarpic; caudex branched; sometimes with short, vertical roots; usually several stems; leaf petioles hollow; fruits glabrous.





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150. Seseli valentinae Schrenk

Synonyms: Seseli squarrosum Schischk., S. tschuense Nikitina



Phytogeographical element: EI-T Habitat: Steppes, screes Elevational range: 700 - 1500 Flowering period: VII - IX

Remarks: Cryptophyte; plant up to 60–70 cm high; several solid stems branching above; basal leaves with oblong blade, 2-pinnately dissected, ultimate segments linear, $5-20 \times 1-2$ mm; umbels 1.5-5 cm in diameter, peduncles elongated, slender; rays (2-)3-6(-9), ca. 10 mm long, unequal; umbellets 12-25-flowered; petals whitish, abaxially pubescent;

stylopodium conic; fruit ovoid, $3-6 \times 2-4$ mm, minutely pubescent.

151. Sium sisarum L.

Synonyms: Sium sisaroideum DC.



Phytogeographical element: I-T, M Habitat: River beds, littoral vegetation

Elevational range: 350 - 2200 Flowering period: VI - VII

Remarks: Cryptophyte; plant 50–80 cm high; glabrous; stem hollow, ribbed; leaves pinnate with 3–11 leaflets; umbels compound; petals white; fruit with well-visible ribs; mezocarp parenchymal.

Usefulness: For.

152. Torilis leptophylla (L.) Rchb. f.

Synonyms: Torilis xanthotricha Stankov



Phytogeographical element: I-T, M, E-S

Habitat: Broad-leaved forests, thermophilous shrubs, forbs

Elevational range: 600 - 1800 Flowering period: IV - VI

Remarks: Therophyte; plant 10–40 cm high; stem stright, strigose; leaves pubescent and rough on both sides; umbels on peduncles 1–5 cm long, usually equal or slightly longer to a leaf growing from the same node; involucre bracts absent; fruits with long prickles; mericarps 4–6 mm long.

153. Torilis nodosa (L.) Geartn.



Phytogeographical element: I-T, M, E-S Habitat: Screes, roadsides, forestsides Elevational range: 700 - 1300

Flowering period: V - VI

Remarks: Therophyte; plant 30–80 cm high, hispid; umbels sessile to shortly pedunculate, leaf opposed; rays 1–2 cm

long.

154. Turgenia latifolia (L.) Hoffm.



Phytogeographical element: Plurireg

Habitat: Juniper forests, broad-leaved forests, steppes,

thermophilous shrubs, forbs Elevational range: 350 - 3400 Flowering period: IV - VII

Remarks: Therophyte; plant 20–60 cm high; leaves pinnately compound; flowers whitish-pink; fruits slightly

flattened with spines. Usefulness: Med, Foo.

155. Zeravschania regeliana Korovin



Phytogeographical element: E, I-T

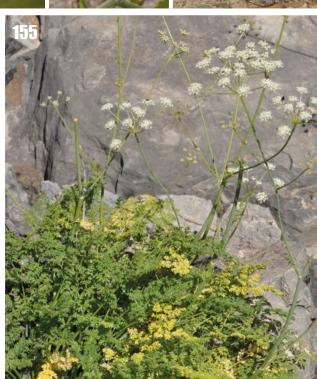
Habitat: Rocks, screes

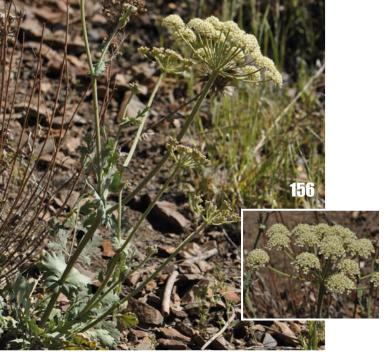
Elevational range: 1400 - 2700 Flowering period: VI - VII

Remarks: Cryptophyte; plant 50–100 cm high; stem hollow; leaves glabrous; leaf blade 2-pinnate 10–20 cm long, 5–10 cm wide; terminal leaf lobe 3–5 mm long, elliptical, toothed; marginal ribs of mericarp broaden and curved towards commissural side; secretory canals

present in mericarp ribs.















156. Zosima korovinii Pimenov

Synonyms: Platytaenia tordyloides Korovin



Phytogeographical element: SE, I-T

Habitat: Juniper forests, loose sandy screes, screes

Elevational range: 2400 - 2700 Flowering period: VI - VII

Remarks: Cryptophyte; plant 40-80 cm high; leaves hairy;

fruits pubescent.

157. Cynanchum acutum L. subsp. sibiricum (Willd.) Rech.f.

Synonyms: Cynanchum sibiricum Willd.



Phytogeographical element: I-T, C-A

Habitat: xeric shrubs, thermophilous shrubs, semideserts, ruderal habitats

Elevational range: 400 – 2700 Flowering period: V-VII

Remarks: Stems many branched and woody at base, to 3 m long, pubescent rarely glabrous; petiole 0.5–4 cm; leaf blade hastate, hastate-cordate; pedicel 4–8 mm; sepals ovate, $1.5-2\times0.5-0.9$ mm, corolla white outside, white

to purple inside.

158. Trachomitum lancifolium (Russanov) Pobed.

Synonyms: Trachomitum venetum (L.) Woodson var. lancifolium

Hara



Phytogeographical element: I-T Habitat: River beds, salt marshes Elevational range: 600 - 900 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 0.5-2 m high; leaves entire;

stamen filaments pubescent.

Usefulness: Ind.

159. Trachomitum scabrum (Russanov) Pobed.

Synonyms: *Trachomitum venetum* (L.) Woodson var. *scabrum* Kitam.



Phytogeographical element: I-T Habitat: River beds, salt marshes Elevational range: 620 - 3300 Flowering period: VI - VII

Remarks: Cryptophyte; plant 0.7-2 m high; leaves serrate-

dentate; stamen filaments glabrous.

Usefulness: Med, Ind.

160. Vinca erecta Regel & Schmalh.



Phytogeographical element: I-T

Habitat: Broad-leaved forests, xeric shrubs, forbs

Elevational range: 900 - 3300 Flowering period: IV - VII

Remarks: Cryptophyte; plant 16–50 cm high; stem erect;

leaves sessile, 1–2 cm long and 0.6–0.7 cm wide.

Usefulness: Med.

161. Arum korolkovii Regel



Phytogeographical element: I-T Habitat: Xeric shrubs, steppes, screes Elevational range: 1000 - 2500 Flowering period: IV - VIII

Remarks: Cryptophyte; plant 25–50 cm high; leaves as long as culm, blade 1.5–2 times longer than petiole; fruits 6–9

mm in diameter, red.















162. Eminium albertii (Regel) Engl.



Phytogeographical element: I-T Habitat: Xeric shrubs, steppes Elevational range: 500 - 1800 Flowering period: IV - VI

Remarks: Cryptophyte; plant with flattened tuber, 2.3–5 cm across; leaves with long petiole, blade divided on 3 segments; tube 4–9 cm long and 1.5–3.5 wide; limb 2–3

times longer than tube.

163. Eminium regelii Vved.



Phytogeographical element: I-T Habitat: Deserts, semi-deserts, steppes

Elevational range: 400 - 750 Flowering period: III - V

Remarks: Cryptophyte; plant with flattened tuber, 1.5-3 cm across; leaves with long petiole, lancolate or oblog, $15-30\times 2.5-5$ cm; the base truncate or subcordate; scape 15-30 cm long; tube of spathe oblong-cylindrical with velutinous blackish-purple, oblong, elliptical limb.

164. Vincetoxicum darvasicum B. Fedtsch.



Phytogeographical element: I-T

Habitat: Xeric shrubs, thermophilous shrubs

Elevational range: 1100 - 2200 Flowering period: V - VI

Remarks: Cryptophyte; plant 25–60 cm high; leaves 2–7 cm long and 1–4 cm wide; flowers brown-green; seeds

9–10 mm long, smooth.

165. Asparagus neglectus Kar. & Kir.

Synonyms: Asparagus misczenkoi Iljin



Phytogeographical element: I-T Habitat: Broad-leaved forests Elevational range: 1400 - 1650 Flowering period: V - VI

Remarks: Cryptophyte; plant up to 40–100 cm high, glabrous; stems suberect, densely branched, with cladodes (except near base), usually covered with stripelike remains of whitish, hyaline periderm when old; pedicels 2–6 mm; inflorescences developing after cladodes; flowers of both sexes solitary or paired.

166. Fessia puschkinioides (Regel) Speta

Synonyms: Scilla bucharica Dessjat., S. puschkinioides Regel



Phytogeographical element: E, I-T

Habitat: Broad-leaved forests, xeric shrubs, forbs

Elevational range: 1500 - 3400 Flowering period: V - VII

Remarks: Cryptophyte; plant (7–)10–20 cm high; leaves 2–3, linear-lanceolate, (4–)10–20 (–30) cm wide; tepals intense blue; lowest pedicels usually longer than perianth.

167. Muscari leucostomum Woronow ex Czerniak.

Synonyms: Muscari bucharicum Regel



Phytogeographical element: I-T

Habitat: Fields, thermophilous shrubs, forbs

Elevational range: 600 - 1000 Flowering period: III - IV

Remarks: Cryptophyte; plant 10–25 cm high; leaves 3–6, linear, 2–3 mm wide; raceme many-flowered; perianth

dark blue, pedicels 1.5-2 mm long.

Usefulness: Foo. Orn.















168. Polygonatum roseum (Ledeb.) Kunth



Phytogeographical element: I-T

Habitat: Broad-leaved forests, riverside forests

Elevational range: 2000 - 2950 Flowering period: VI - VII

Remarks: Cryptophyte; plant 40–80 cm high; rhizome terete, 3–5 mm thick; leaves in whorls of 3 or 4, sessile, lanceolate to linear-lanceolate; inflorescences 1- or 2-flowered, peduncle 1–1.5 cm, pedicel 1–4 mm; perianth pale purple, cylindric, 1–1.2 cm; berries 7–11 mm in

diameter, 2–7-seeded. Usefulness: Orn.

169. Polygonatum sewerzowii Regel



Phytogeographical element: I-T

Habitat: Juniper forests, broad-leaved forests

Elevational range: 900 - 2200 Flowering period: IV - VI

Remarks: Cryptophyte; plant perennial, 40–80 cm high; in Tajikistan the genus Polygonatum Adans. is represented by two species: *P. sewerzovii* with white flowers and *P.*

roseum (Ledeb.) Knuth. with pink flowers.

Usefulness: Orn.

170. Asplenium ruta-muraria L.



Phytogeographical element: Plurireg

Habitat: Rocks

Elevational range: 1450 - 2550 Sporing period: VI to VIII

Remarks: Cryptophyte; plant 2-10(-15) cm high; lamina deltoid–triangular to ovate, $(1-)2-5(-8) \times 1-3(-5)$ cm, apex obtuse to subacute, 2-pinnate or pinnate–pinnatifid; veins free, rarely connected near margin, never united into a marginal vein; sori 5-12 per pinna, subelliptic to linear.

Usefulness: Med.

171. Asplenium septentrionale (L.) Hoffm.



Phytogeographical element: Plurireg

Habitat: Rocks

Elevational range: 1100 - 4100 Sporing period: VI to VIII

Remarks: Cryptophyte; plant 8–15 cm high; scales dark brown; leaf segments linear, $6-10 \times 0.1$ –0.3 cm, base gradually decurrent onto stipe, minutely forked again at apex; sori 1–5 per segment, linear, 1–2 cm, at maturity covering entire surface; spores with lophate perispore.

172. Asplenium viride Huds.



Phytogeographical element: Plurireg

Habitat: Rocks

Elevational range: 1250 - 2100 Sporing period: VII to VIII

Remarks: Cryptophyte; plant 8–15 cm high; lamina less than 1.5 cm wide; stipe and rachis green, never

gemmiferous.

173. Ceterach officinarum Willd.

Synonyms: Asplenium ceterach L.



Phytogeographical element: I-T, M

Habitat: Rocks

Elevational range: 700 - 1600 Sporing period: IV to VII

Remarks: Cryptophyte; plant up to 12 cm high; rhizome short; fronds green, lamina pinnatipartite with orangebrown trichomes on the abaxial surface, petiole 1–5 cm long, shorter than the corpus of the leaf; sori linear.

Usefulness: Med.

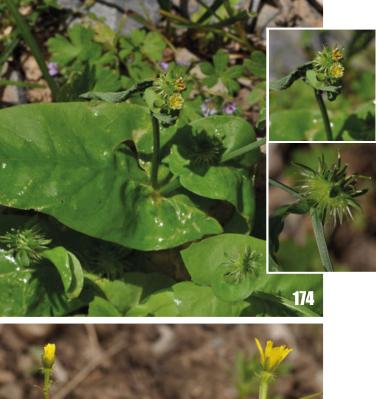
















174. Acanthocephalus amplexifolius Kar. & Kir.



Phytogeographical element: I-T Habitat: Meadows, fields, steppes, forbs

Elevational range: 700 - 2200 Flowering period: IV - V

Remarks: Therophyte; plant 15–40 (–50) cm high; stem glabrous; achene with longitudinal ribs, apex with filiform

175. Acanthocephalus benthamianus Regel



Phytogeographical element: I-T

Habitat: Meadows, fields, steppes, forbs

Elevational range: 650 - 3800 Flowering period: IV - V

Remarks: Therophyte; plant 10-50 (-70) cm high; stem strigose at base; achene tuberculate along ribs, apex with

short beak.

176. Achillea arabica Kotschy

Synonyms: Achillea biebersteinii Afan.



Phytogeographical element: I-T, E-S, M Habitat: Steppes, thermophilous shrubs, forbs

Elevational range: 700 - 2850

Flowering period: V - VI

Remarks: Cryptophyte; plant up to 100 cm high; leaves usually densely pilose, with linear, cute-acuminate ultimate segments; rachis up to 1 mm wide; phyllaries

pale, abaxially hairy. Usefulness: Med.

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177. Achillea bucharica C. Winkl.



Phytogeographical element: I-T

Habitat: Alpine meadows, moraines and snow-beds, forbs

Elevational range: 2700 - 3800 Flowering period: VI - VII

Remarks: Cryptophyte; plant up to 40 cm high, densely pubescent; leaves up to 6 cm long and 0.3–0.6 cm wide;

phyllaries with wide dark brown margins.

178. Achillea filipendulina Lam.



Phytogeographical element: Asteraceae, I-T, E-S

Habitat: River beds, screes, ruderal, steppes, xeric shrubs,

forbs

Elevational range: 1000 - 4000 Flowering period: VI - VII

Remarks: Cryptophyte; plant up to 120 cm high; leaves usually densely appressed hairy, with oblong-lanceolate, subacute ultimate segments; rachis more than 1.5 mm wide; phyllaries pale to whitish-green, abaxially pubescent

and gland dotted. Usefulness: Med.

179. Achillea millefolium L.



Phytogeographical element: Plurireg Habitat: Meadows, steppes, forbs Elevational range: 1300 - 3500 Flowering period: VI - VII

Remarks: Cryptophyte, hemicryptophyte; plant up to 100 cm high; ultimate leaf segments narrowly linear-oblong to lanceolate, mucronate; rachis 1.5–2 mm wide; phyllaries

with pink to brownish scarious margins.

Usefulness: Med, For, Foo.

















180. Ajania fastigiata (C. Winkl.) Poljakov



Phytogeographical element: EI-T Habitat: Screes, steppes, xeric shrubs Elevational range: 2000 - 2700 Flowering period: VI - IX

Remarks: Cryptophyte; plant 30–90 cm high; stem weakly branched at base; middle and lower stem leaf blades

usually bipinnate with 5-7 lobes.

181. Ajania gracilis (Hook. f. & Thomson) Poljakov



Phytogeographical element: EI-T Habitat: River beds, rocks, screes Elevational range: 3600 - 4300 Flowering period: VI - IX

Remarks: Cryptophyte; plant 15–45 (–60) cm high; stem strongly branched at base, woody for much of length; middle and lower stem leaf blades usually twice ternately

divided.

182. Ajania scharnhorstii (Regel & Schmalh.) Tzvelev



Phytogeographical element: EI-T

Habitat: Rocks, screes Elevational range: 2000 - 4600 Flowering period: VI - IX

Remarks: Chamaephyte; plant 4–10 cm high, gray-white, densely and thickly pubescent; leaves bipalmatisect; capitula solitary; involucre 7–10 mm in diameter;

phyllaries with scarious brown margin.

183. Ajania tibetica (Hook. f. & Thomson) Tzvelev



Phytogeographical element: EI-T

Habitat: Rocks, screes, alpine semi-deserts, moraines and

snow-beds

Elevational range: 3550 - 4800 Flowering period: VII - IX

Remarks: Cryptophyte; plant 4-20 cm high; leaf blade 2-pinnatisect, 1-2 cm long, both surfaces densely

tomentose; involucre 4-6 mm in diameter.

184. Alfredia acantholepis Kar. & Kir.



Phytogeographical element: EI-T Habitat: Alpine meadows, forbs Elevational range: 1600 - 3300 Flowering period: VI - X

Remarks: Cryptophyte; plant 40-120 cm high; stem purplish red; leaves papery, with 1-2 mm long spinules; basal and lower stem leaves with lobed petiole and large undivided blade truncate to cordate at base; capitula erect.

185. Alfredia nivea Kar. & Kir.



Phytogeographical element: EI-T

Habitat: Alpine meadows, coniferous forests, forbs

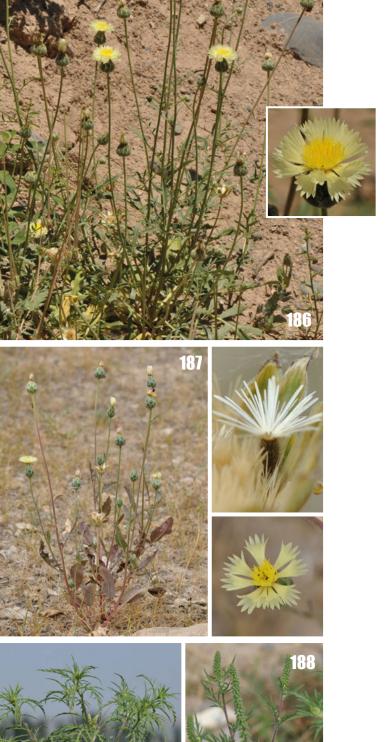
Elevational range: 1500 - 2400 Flowering period: VI - IX

Remarks: Cryptophyte; plant 35–60 cm high; stem purplish red; leaves leathery, with slender 5-10 mm long spines; basal and lower stem leaves with winged petiole;

capitula nodding.









186. Amberboa bucharica Iljin



Phytogeographical element: I-T

Habitat: Fields, steppes, thermophilous shrubs

Elevational range: 350 - 2200 Flowering period: IV - V

Remarks: Therophyte; plant 15–80(–100) cm high; inner phyllaries leathery, with red veins, ciliate at margin.

187. Amberboa turanica Iljin



Phytogeographical element: I-T

Habitat: Fields, steppes, thermophilous shrubs, forbs

Elevational range: 400 - 2500 Flowering period: IV - V

Remarks: Therophyte, hemicryptophyte; plant 5–50 cm high; inner phyllaries with triangular to lanceolate apical

appendages.

188. Ambrosia artemisiifolia L.



Phytogeographical element: A; Plurireg Habitat: Roadsides, fallows, arable fields

Elevational range: 500 - 1500 Flowering period: V - VIII

Remarks: Therophyte, hemicryptophyte; plant 10–120 cm high; leaves pinnately 1- or 2-lobed; involucres of male capitula 2–3 mm in diameter; male florets 12–20.

189. Anacantha darwasica (C. Winkl.) Soják

Synonyms: *Modestia darwasica* (C. Winkl.) Charadze & Tamamsch.



Phytogeographical element: E, I-T Habitat: River beds, screes Elevational range: 1300 - 3200 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 15–60 cm high; leaves sessile, oblong; capitula bell-shaped, phyllaries with spine longer

than phyllaries; achene pyramidal.

190. Anaphalis darvasica Boriss.



Phytogeographical element: SE, I-T

Habitat: Rocks, screes

Elevational range: 2000 - 3700 Flowering period: VI - VII

Remarks: Chamaephyte; plant 40–60 cm high; leaves 2–4 cm long; involucre 3–4 mm (4–7 mm during fruiting)

in diameter.

191. Anaphalis sarawschanica (C. Winkl.) B. Fedtsch.



Phytogeographical element: I-T

Habitat: Screes

Elevational range: 3000 - 3700 Flowering period: VI - VII

Remarks: Cryptophyte; plant 5–10 cm high; leaves up to 2 cm long; involucre 8–10(–12) mm in diameter.















192. Arctium sardaimionense Rassulova & B.A. Sharipova



Phytogeographical element: E, I-T

Habitat: Riverside forests, orchards and gardens

Elevational range: 800 - 2100

Flowering period: VIII

Remarks: hemicryptophyte; plant 30–40 cm high; outer and middle phyllaries linear; achene 4–4.5 mm long.

193. Artemisia alba Turra

Synonyms: Artemisia viridis Willd. ex DC



Phytogeographical element: EI-T

Habitat: Alpine semi-deserts, alpine steppes

Elevational range: 4000 - 4400 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 10–25 cm high; lower stem leaves both surfaces wrinkled and gland-dotted; capitula

5-8 mm in diameter.

194. Artemisia annua L.



Phytogeographical element: Plurireg

Habitat: Ruderal, fields Elevational range: 400 - 3000 Flowering period: IV - VIII

Remarks: Therophyte; plant 40–140 cm high; basal and lower stem leaves long petiolate, 3-pinnatisect; capitula 1.5–2.5 mm in diameter, with up to 30 greenish-yellow

florets

195. Artemisia dracunculus L.



Phytogeographical element: Plurireg

Habitat: River beds, meadows, pastures, forbs

Elevational range: 1700 - 4000 Flowering period: VII - VIII

Remarks: Cryptophyte; plant (20–)40–150 cm high, strongly aromatic to inodorous; leaves entire, linear, linear-lanceolate, elliptic-lanceolate, or lanceolate, occasionally some with 1 (or 2) lateral lobes; capitula

globose, 3–4 mm in diameter. Usefulness: Med, For, Foo.

196. Artemisia macrocephala Jacquem. ex Besser



Phytogeographical element: EI-T, E-S Habitat: Alpine semi-deserts, salt marshes

Elevational range: 3000 - 4000 Flowering period: VII - VIII

Remarks: Therophyte; plant 10–30(–50) cm, whitish-grey hairy; basal and lower stem leaves with petiole 1.5–3 cm long, and blade +/- orbicular, 1.0–1.5 cm long; capitula

5–10(–15) mm in diameter. Usefulness: For, Hou.

197. Artemisia pamirica C. Winkl.



Phytogeographical element: EI-T

Habitat: Screes, alpine semi-deserts, alpine steppes

Elevational range: 2500 - 4300

Flowering period: VIII

Remarks: Cryptophyte; plant (20–)35–40 cm high, stems covered with lobed hairs but becoming glabrous with age; leaves lanceolate; capitula globose 2–3.5 mm in diameter.



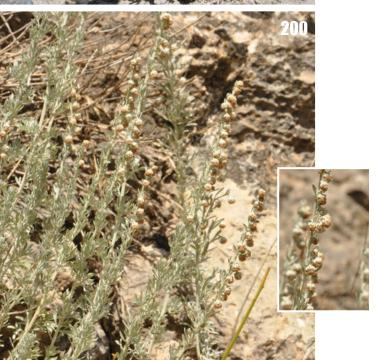




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198. Artemisia porrecta Krasch. ex Poljakov



Phytogeographical element: SE, I-T Habitat: River beds, steppes Elevational range: 900 - 2600 Flowering period: IX - X

Remarks: Chamaephyte; plant 45–60(–70) cm high, with numerous brownish fertile shoots; synflorescence pyramidal; capitula 3–4 mm long, ovate, sessile.

Usefulness: For.

199. Artemisia rhodantha Rupr.



Phytogeographical element: EI-T

Habitat: Alpine semi-deserts, alpine steppes

Elevational range: 3800 - 4300 Flowering period: VIII - IX

Remarks: Chamaephyte; plant up to 15 cm high, with numerous stelile and fertile shoots; blade of lower stem leaves oblong-ovate in outline; capitula up to 3 mm long, ovate; outer phyllaries broadly lanceolate, margin

scarious.
Usefulness: For.

200. Artemisia rutifolia Stephan ex Spreng.



Phytogeographical element: I-T Habitat: Rocks, screes Elevational range: 1400 - 4200 Flowering period: VII - VIII

Remarks: Chamaephyte; plant 20–80 cm high, strongly aromatic, silky puberulent; synflorescence a racemelike

panicle, involucre 3-9 mm in diameter.

201. Artemisia santolinifolia Turcz. ex Krasch.



Phytogeographical element: I-T Habitat: Steppes, xeric shrubs Elevational range: 1800 - 4500 Flowering period: VII - VIII

Remarks: Chamaephyte; plant 10–45(–80) cm high; leaves narrowly 3-pinnatisect; capitula 3–5 mm in diamerer; outermost phyllaries linear-oblong, not scarious-margined.

202. Artemisia turanica Krasch.



Phytogeographical element: I-T Habitat: Steppes

Elevational range: 500 - 1100 Flowering period: IX - X

Remarks: Chamaephyte; plant 20–40 cm high, with fertile shoots becoming purplish or blackish with age; synflorescence pyramidal, dense; capitula up to 3 mm long, ovate; outer phyllaries very small, elliptical; inner phyllaries oblong or linear-oblong, with broad scarious margin.

Usefulness: For.

203. Aster alpinus L. var. serpentimontanus (Tamamsch.) Ling

Synonyms: Aster serpentimontanus Tamamsch.



Phytogeographical element: I-T, E-S Habitat: Alpine meadows, fens and mires

Elevational range: 2900 - 4500 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 8–25 cm high; most leaves arranged in rossete, stem leaves linear or linear-lanceolate;

capitula solitary, up to 4 cm in diameter.

















204. Bidens frondosa L.



Phytogeographical element: A; Plurireg Habitat: River beds, ruderal, fields Elevational range: 550 - 1250 Flowering period: VI - VII

Remarks: Therophyte; plant 25–100(–150) cm high; at least lower leaves pinnate with leaflets on petioles;

achenes blackish to brown, tuberculate.

205. Brachanthemum kirghisorum Krasch.



Phytogeographical element: EI-T Habitat: Screes, semi-deserts Elevational range: 1750 - 3600 Flowering period: VI - IX

Remarks: Nanophanerophyte; plant 5–25 cm high; leaf blade grayish green, pinnately 4–7-lobed (upper stem leaves palmately 3-lobed); outer phyllaries 1/3–2/5 as long as inner, margin membranous.

206. Carduus nutans L.

Synonyms: Carduus coloratus Tamamsch., C. schischkinii Tamamsch., C. songoricus Tamamsch.



Phytogeographical element: I-T, E-S Habitat: River beds, screes Elevational range: 1700 - 2600 Flowering period: VI - VII

Remarks: hemicryptophyte; plant 30-100 cm high; capitula

solitary; involucre 4–7 cm in diameter.

207. Carthamus oxyacanthus M. Bieb.



Phytogeographical element: I-T

Habitat: Semi-deserts, fields, salt marshes, steppes

Elevational range: 500 - 1300 Flowering period: VI - VIII

Remarks: Therophyte, hemicryptophyte; plant 20–50(–70) cm high; leaves serrate, particular tooth ended with spine; leaf blade both surfaces glandular, abaxially covered with white hairs; capitula 1–1.2 cm in diameter; pappus absent.

208. Carthamus tinctorius L.



Phytogeographical element: I-T, E-S Habitat: Semi-deserts, salt shrubs, steppes

Elevational range: 450 - 1000 Flowering period: VII - VIII

Remarks: Therophyte; plant (20–) 50–100(–150) cm high; leaf blade finely serrate or entire; capitula 2–2.5 cm in

diameter; pappus usually absent.

Usefulness: Foo.

209. Centaurea benedicta (L.) L.

Synonyms: Cnicus benedictus L.



Phytogeographical element: I-T, M, E-S Habitat: Meadows, fields, steppes Elevational range: 400 - 1700 Flowering period: V - VI

Remarks: Therophyte; plant 5–50 cm high; uppermost leaves large, exceeding capitula; capitula concealed by uppermost leaves; involucre ovoid, ca. 2 cm in diameter.

Usefulness: Med, Foo, Ind.













210. Centaurea besseriana DC.

Synonyms: Centaurea squarrosa Willd.



Phytogeographical element: Plurireg Habitat: Screes, steppes, forbs Elevational range: 800 - 3900 Flowering period: VI - VIII

Remarks: Cryptophyte, hemicryptophyte; plant 20–70 cm high; leaf blade both surfaces gland-doteed; capitula numerous; involucre 2.5–4 mm in diameter; phyllaries with 3 veins; outer and middle phyllaries with whitish appendages; pappus 1–2.7 mm long.

211. Centaurea bruguierana (DC.) Hand.-Mazz. subsp. belangeriana (DC.) Bornm.

Synonyms: Centaurea belangeriana (DC.) Stapf



Phytogeographical element: I-T

Habitat: Steppes

Elevational range: 450 - 1100 Flowering period: V - VIII

Remarks: Therophyte; plant up to 50 cm high; leaves pubescent and gland-dotted; capitula solitary, 0.5–1.2 cm in diameter, surrounded by upper stem leaves; middle phyllaries with white spine up to 2 cm long.

212. Centaurea iberica Trevir. ex Spreng.



Phytogeographical element: I-T, E-S, M

Habitat: River beds, meadows, pastures, ruderal, steppes

Elevational range: 400 - 2300 Flowering period: V - VIII

Remarks: Therophyte; plant 20–100 cm high; leaves sparsely strigose and gland-dotted; terminal spine of middle phyllaries straight, up to 25 mm long.

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213. Centaurea pulchella Ledeb.

Synonyms: Hyalea pulchella (Ledeb.) C. Koch



Phytogeographical element: I-T, E-S

Habitat: River beds, loose sandy screes, screes, steppes

Elevational range: 350 - 3500 Flowering period: IV - VI

Remarks: Therophyte; plant (10–) 20–70 cm high; stem leaves sessile; capitula many; outer and middle phyllaries ovate or ovate-oblong, without appendages; involucre 4–6 mm in diameter, 1–1.2 cm long; flowers red-pinkish during anthesis, afterwards yellow.

214. Centaurea ruthenica Lam.



Phytogeographical element: I-T, E-S, M

Habitat: Rocks, screes, steppes, xeric shrubs, forbs

Elevational range: 2100 - 3300 Flowering period: VI - VII

Remarks: Cryptophyte; plant 50–100 cm high; capitula 2–2.5 cm in diameter; outer and middle phyllaries ovate or broadly oblong, with narrow scarious margin, without

appendages; pappus 4.5–6 mm long.

215. Centaurea solstitialis L.



Phytogeographical element: I-T Habitat: Ruderal, steppes, forbs Elevational range: 450 - 1600 Flowering period: VI - VIII

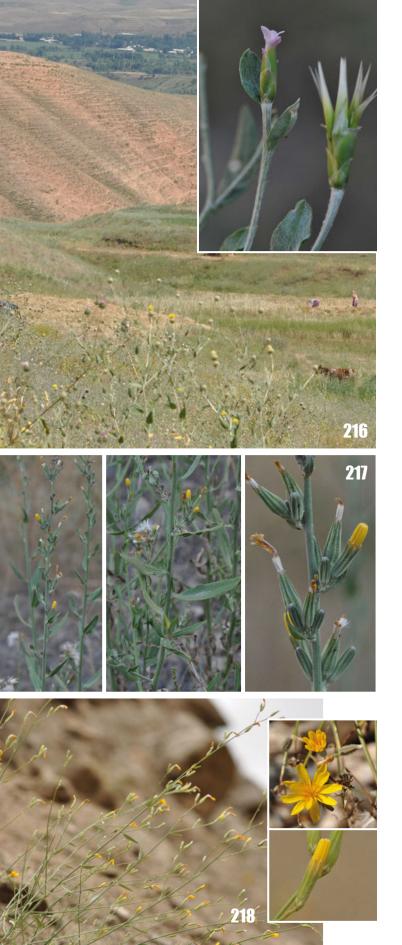
Remarks: Therophyte; plant 30–100 cm high; stems winged; leaf blade both surfaces cobwebby; capitula ovate-conical, 1–1.2 cm in diameter; outer and middle phyllaries

with yellow, recurved spines up to 3 cm long.









216. Chardinia orientalis (L.) Kuntze



Phytogeographical element: I-T Habitat: Screes, steppes Elevational range: 350 - 1800 Flowering period: IV - VI

Remarks: Therophyte; plant 10–50 cm high; leaves narrowly eliptical, lanceolate or linear; capitula 1–2.5 cm in diameter, with 8–12 florets; phyllaries glabrous; outer phyllaries broadly ovate; pappus 1–1.7 cm long.

217. Chondrilla canescens Kar. & Kir.



Phytogeographical element: I-T Habitat: River beds, screes, fields Elevational range: 400 - 3000 Flowering period: VI - VII

Remarks: Cryptophyte; plant 75–150 cm high, grayish-green; middle and upper stem leaves lanceolate or linnear-lanceolate; capitula 0.3–1.5 cm in diameter, with 10–11 florets; apical part of achene straight (not bent).

218. Chondrilla gibbirostris Popov



Phytogeographical element: I-T Habitat: River beds, screes Elevational range: 900 - 1800 Flowering period: VI - VII

Remarks: Cryptophyte; plant 60–150 cm high green; capitula 0.3–1.5 cm in diameter, with 9–11 florets; apical

part of achene bent.

219. Chondrilla maracandica Bunge



Phytogeographical element: I-T Habitat: River beds, screes Elevational range: 1500 - 2900 Flowering period: VI - VII

Remarks: Cryptophyte; plant 30–70 cm high; stem richly branched, poorly leafy, redish or purplish at base; capitula with 9-11 florets; beak of achene 0.5-0.7 mm long.

220. Cicerbita thianschanica (Regel & Schmalh.) Beauverd



Phytogeographical element: I-T Habitat: Xeric shrubs, forbs Elevational range: 2000 - 3200 Flowering period: VI - IX

Remarks: Cryptophyte; plants 100–125 cm high; upper part of stem glabrous; capitula with 15-20 florets.

221. Cicerbita zeravschanica Popov ex Kovalevsk.



Phytogeographical element: E, I-T Habitat: Alpine meadows, forbs Elevational range: 1450 - 3100 Flowering period: VI - IX

Remarks: Cryptophyte; plant 30-80(-100) cm high; upper part of stem glandular; capitula with 5 florets. Sometimes regarded as synonym of Kovalevskiella zeravschanica (Popov

ex Kovalevsk.) Kamelin







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222. Cichorium intybus L.



Phytogeographical element: Plurireg Habitat: River beds, ruderal, fields Elevational range: 400 - 2700 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 40-110 cm high; stem leaves similar to basal leaves but smaller and less divided; synflorescence spiciform-paniculiform; achene brown, subcylindric to obovoid.

Usefulness: Med, For, Foo, Hou.

223. Cirsium badakhschanicum Kharadze



Phytogeographical element: E, I-T

Habitat: River beds, alpine meadows, fens and mires

Elevational range: 2500 - 3700 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 60–100 cm high; stems unwinged; capitula 2-3.5 cm in diameter, in clusters (each composed of 2-5 capitula); outer phyllaries ovatelanceolate, with spiny margin; achene glabrous; pappus

1.2–1.3 cm long.

224. Cirsium esculentum (Siev.) C.A. Mey.



Phytogeographical element: I-T, E-S, M

Habitat: Riverside forests, fens and mires, pastures

Elevational range: 2200 - 2800

Flowering period: VIII

Remarks: Cryptophyte; plant stemless, or stem very short, 7–9 cm high; capitula 2.5–3 cm wide; outer phyllaries ovate or ovate-lanceolate, margin ciliate; florets and achene glabrous, pappus 2.4-2.5 cm long.

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225. Cirsium incanum (S.G. Gmel) Fisch.



Phytogeographical element: I-T, M, E-S Habitat: Fields, ruderal habitats, steppes

Elevational range: 350 - 3700 Flowering period: V - VII

Remarks: Cryptophyte; plant up to 100 cm high; stems unwinged; leaves abaxially tomentose; capitula 1.4–5 cm in diamer; outer phyllaries ovate; achene glabrous; pappus

2.5–3 cm long.

226. Cirsium ochrolepideum Juz.



Phytogeographical element: I-T Habitat: River beds, ruderal, fields Elevational range: 600 - 3700 Flowering period: IV - V

Remarks: Cryptophyte; plant 40–120 cm high; stems with spiny wings; capitula 1–1.5 cm in diameter; outer and middle phyllaries ovate; achene glabrous; pappus 2–2.5

cm long.

227. Cirsium vulgare (Savi) Ten.



Phytogeographical element: Plurireg

Habitat: River beds, riverside forests, ruderal, fields

Elevational range: 800 - 2200 Flowering period: VII - IX

Remarks: Cryptophyte; plant 25–150 cm high; stems winged; capitula 2.5–4.5 cm in diameter, phyllaries spreading outside; achene glabrous; pappus 2.5–2.8 cm

long.

Usefulness: Med.

























228. Conyza bonariensis (L.) Cronq.

Synonyms: Erigeron bonariensis L.



Phytogeographical element: A; Plurireg

Habitat: Ruderal habitats Elevational range: 800 - 900 Flowering period: VI - VII

Remarks: Therophyte; plant 20–80 cm high; leaves edges smooth; flowerheads single; fruits 2 mm with yellowish

hairs.

229. Conyza canadensis (L.) Cronq.

Synonyms: Erigeron canadensis L.



Phytogeographical element: A; Plurireg

Habitat: Ruderal places Elevational range: 600 - 1500 Flowering period: V - VIII

Remarks: ; plant erect, (3–)50–200 (–350) cm, branched mostly distally; phyllaries usually glabrous, sometimes sparsely strigose; corollas of pistillate florets with laminae 0.3–1 mm; cypselae uniformly pale tan to light graybrown; receptacles 1–1.5(–3) mm diameter in fruit; pappi

of 15-25, white bristles 2-3 mm.

230. Cousinia albertoregelia C. Winkl.



Phytogeographical element: E, I-T Habitat: Screes, steppes, xeric shrubs Elevational range: 800 - 1500 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 55–150(–200) cm high; caudex covered with dry residues of leaves; syflorescences spike-like; outer phyllaries linear, acuminate; achene obovate, tiangular or quadrangular in cross section.

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231. Cousinia anomala Franch.



Phytogeographical element: E, I-T

Habitat: Steppes

Elevational range: 1700 - 2600 Flowering period: VI - VII

Remarks: Cryptophyte; plant 20–40 cm high; basal leaves oblong-lanceolate, entire; capitula 15 mm long; apical part of outer phyllaries with 2–3 pairs of spines; achene

obovate, glabrous.

232. Cousinia buphthalmoides Regel



Phytogeographical element: I-T Habitat: River beds, screes, steppes Elevational range: 2200 - 3700 Flowering period: VI - VII

Remarks: hemicryptophyte; plant 15–45 cm high; basal leaves lyrate, arranged in rosette; upper stem leaves sessile; capitula 13–15 mm wide; phyllaries lanceolate,

spine recurved; achene obovate.

233. Cousinia corymbosa C. Winkl.



Phytogeographical element: E, I-T

Habitat: Screes, forbs

Elevational range: 2000 - 2400

Flowering period: VII

Remarks: Cryptophyte; plant 80–100 cm high, gayishgreen; capitula 17–20 mm wide; involucre cobwebby; middle phyllaries spreading outside, gradually narrowed to long (up to 12 mm) spine; achene obovate, tiangular in

cross section.



















234. Cousinia darwasica C. Winkl.



Phytogeographical element: I-T Habitat: Steppes, forbs Elevational range: 1500 - 2400 Flowering period: VIII

Remarks: Hemicryptophyte; plant 30-50 cm high; basal leaves arranged in rosette; upper stem leaves sessile; capitula 12–13 mm wide; outer phyllaries narrowly lanceolate, spreading outside; achene obovate.

235. Cousinia divaricata C. Winkl.



Phytogeographical element: E, I-T Habitat: Thermophilous shrubs Elevational range: 1150 - 2000 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 25-30 cm high; basal leaves lyrate, arranged in rossete; middle and upper leaves sessile; capitula 7–11 mm wide, ovate-cylindrical; phyllaries spreading outside; achene triangular in cross section.

236. Cousinia ferghanensis Bornm.



Phytogeographical element: SE, I-T

Habitat: River beds, semi-deserts, steppes, xeric shrubs

Elevational range: 400 - 2000 Flowering period: V - VII

Remarks: hemicryptophyte; plant 30-50 cm high; basal leaves lyrate, terminal lobe ovate; middle and upper leaves sessile; capitula 20-25 mm wide; involucre cobwebby; receptacle bristles rough; inner phyllaries scarious; achene oblong-obovate, smooth and glossy.

237. Cousinia grigoriewii Juz.



Phytogeographical element: E, I-T Habitat: River beds, screes Elevational range: 700 - 1800

Flowering period: VI

Remarks: hemicryptophyte; plant 30-55 cm high; leaves abaxially white-tomentose; basal leaves arranged in rossete; capitula 12-20 mm wide; involucre cobwebby; middle phyllaries with arcuate spines; achene obovate, with dark spots.

238. Cousinia laetevirens C. Winkl.



Phytogeographical element: E, I-T Habitat: Screes, steppes, forbs Elevational range: 2000 - 3500 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 30–50 cm high; caudex covered with dry residues of leaves; leaves pinnatisect with lateral lobes 0.5-2 mm wide; capitula 10-15 mm wide; phyllaries spreading outside; achene obovate, glabrous.

239. Cousinia carduncelloidea Regel & Schmalh.



Phytogeographical element: SE, I-T

Habitat: Rocks, screes Elevational range: 1500 - 2500 Flowering period: V - VI

Remarks: Hemicryptophyte; plant 25-50 high; leaves abaxially tomentose; basal leaves arranged in rosette, with 5-8 pairs of lateral lobes; capitula 2.0-2.5(-3) cm wide;

middle phyllaries keeled; achene obovate.













240. Cousinia mollis schrenk



Phytogeographical element: I-T

Habitat: xeric shrubs, thermophilous shrubs, steppes,

semideserts, ruderal habitats Elevational range: 400 – 2000 Flowering period: V-VII

Remarks: Plant 15-8m cm high; densely covered with white tomentose hairs, inflorescence 3-6 flowered; corolla

yellow, and pinkish after anthesis.

241. Cousinia mulgediifolia Bornm.



Phytogeographical element: I-T

Habitat: Steppes, xeric shrubs, thermophilous shrubs

Elevational range: 500 - 2100 Flowering period: VII - VIII

Remarks: hemicryptophyte; plant 45–100 cm high; stems almost glabrous; leaves adaxially glabrous; capitula 12–15 mm wide; involucre cobwebby; outer and middle phyllaries linnear-lanceolate; achene oblong-obovate.

242. Cousinia olgae Regel & Schmalh.



Phytogeographical element: I-T Habitat: Fields, steppes Elevational range: 1000 - 2400 Flowering period: V - VII

Remarks: hemicryptophyte; plant 10–70 cm high; leaf margin almost entire, apex spiny; capitula 13–15 mm wide; receptacle bristles smooth; phyllaries narrowly lanceolate, keeled; achene obovate, with dark spots.

243. Cousinia ovczinnikovii Tscherneva



Phytogeographical element: E, I-T

Habitat: Screes, alpine steppes, moraines and snow-beds

Elevational range: 3000 - 4000

Flowering period: VII

Remarks: hemicryptophyte; plant 50–60 cm high, cobwebby; leaves adaxially grayish-green; capitula flattened, ca. 20 mm wide; phyllaries lanceolate, spreading

outside; achene obovate, smooth.

244. Cousinia pannosa C. Winkl.



Phytogeographical element: E, I-T Habitat: Steppes, xeric shrubs, forbs Elevational range: 2700 - 4000 Flowering period: VIII - IX

Remarks: Cryptophyte; plant 25–60 cm high, densely cobwebby; caudex covered with dry residues of leaves; capitula solitary, 15–20 mm wide; phyllaries lanceolate,

spreading outside; achene obovate.

245. Cousinia pseudarctium Bornm.



Phytogeographical element: E, I-T

Habitat: Broad-leaved forests, fields, steppes, xeric shrubs,

forbs

Elevational range: 550 - 2700 Flowering period: VI - VII

Remarks: Cryptophyte; plant 80–100 cm high; basal leaves eliptical, arranged in rossete; capitula oblong-cylindrical or ovate, 10–12 mm wide, with 25–40 florets; phyllaries lanceolate, spreading outside, with hooked spines; achene

obovate, glabrous.















246. Cousinia pseudodshisakensis Tschern. & Vved.



Phytogeographical element: E, I-T Habitat: Juniper forests, screes, fields Elevational range: 2000 - 2800 Flowering period: V - VIII

Remarks: hemicryptophyte; plant 20–50 cm high; leaves abaxially white-tomentose; basal and lower stem leaves with 3–4 pairs of lateral lobes; capitula 20–30 mm wide; involucre cobwebby; outer and middle phyllaries keeled; achene obovate, smooth.

247. Cousinia pulchella Bunge



Phytogeographical element: I-T Habitat: Broad-leaved forests, forbs Elevational range: 1100 - 3400 Flowering period: VI - VII

Remarks: hemicryptophyte; plant 25–60 cm high; stems winged, wings 4–5 mm wide; leaf blade lanceolate, entire; capitula, ovate, 8–10 mm wide; phyllaries more than 100, with thin apical spines; achene narrowly obovate.

248. Cousinia pusilla C. Winkl.



Phytogeographical element: E, I-T

Habitat: River beds, salt shrubs, salt marshes

Elevational range: 400 - 900

Flowering period: V

Remarks: Therophyte; plant 8–15(–25) cm high; middle and upper leaves sessile, serrate, particular tooth ended with 1–2 mm long spine; capitula 7–9 mm wide, with 10–15 florets; phylaries spreading outside; achene obovate.

249. Cousinia radians Bunge



Phytogeographical element: I-T

Habitat: Screes, fields, steppes, xeric shrubs, forbs

Elevational range: 800 - 2900 Flowering period: VI - VII

Remarks: hemicryptophyte; plant 30–60 cm high; leaves abaxially white-tometose; basal leaves lyrate, arranged in rossete; capitula 15–20 mm wide; phyllaries 100–140, spreading outside; achene oblong-ovate, triangular in cross section.

250. Cousinia refracta (Bornm.) Juz.



Phytogeographical element: E, I-T Habitat: Steppes, thermophilous shrubs

Elevational range: 800 - 1900 Flowering period: VI - VII

Remarks: Cryptophyte; plant 60–120 cm high; basal leaves lyrate, arranged in rossete; capitula ca. 15 mm wide, with 17 florets; phyllaries ca. 100, with appical part sharply recurved;

achene obovate, triangular in cross section.

251. Cousinia sclerophylla Juz.



Phytogeographical element: E, I-T

Habitat: Rocks, screes Elevational range: 600 - 1400 Flowering period: VI

Remarks: Cryptophyte; plant 25–50 cm high; leave shallow-lobed, strongly spiny; capitula up to 12 mm wide, with 20 florets; involucre cobwebby; phyllaries ca. 30, with short spine; achene inversely pyramidal, with thiny teeth in apical

part.

















252. Cousinia semilacera Juz.



Phytogeographical element: I-T Habitat: Screes, alpine steppes Elevational range: 2200 - 3500

Flowering period: VIII

Remarks: Cryptophyte; plant 30–35 cm high; leaves pinnatifid, with lateral lobes 0.5–2 mm wide; capitula 12–15(–20) mm wide; outer phyllaries leathery, broadly lanceolate, with short spines; middle and inner phyllaries with broad, scarious, serrulate appendages; achene obovate.

253. Cousinia splendida C. Winkl.



Phytogeographical element: E, I-T Habitat: Xeric shrubs, forbs Elevational range: 2300 - 3300 Flowering period: VIII - IX

Remarks: Cryptophyte; plant 50–70 cm high; leaves abaxially white-tomentose, pinnatifid, with lateral lobes 4–7 mm wide; capitula 18–25 mm wide; outher phyllaries with distinct midvein; inner phyllaries with scarious and spiny appendages.

254. Cousinia stephanophora C. Winkl.



Phytogeographical element: E, I-T

Habitat: Screes, forbs

Elevational range: 1700 - 4000 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 20–40 cm high; basal leaves arranged in rosette, pinnatifid, with lateral lobes 3–6 mm wide; capitula (10–)15–18(–20) mm wide, slightly cobwebby; phyllaries 50–60, lanceolate, apical part recurved with very short spines; achene obovate, with theeth in apical part.

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255. Cousinia submutica Franch.



Phytogeographical element: E, I-T

Habitat: Steppes, forbs Elevational range: 1600 - 3000 Flowering period: VII - VIII

Remarks: hemicryptophyte; plant 20-60 cm high; leaves abaxially white-tomentose; basal leaves arranges in rossete, lobed, sometimes lyrate; capitula 10-12(-15) mm wide, with 60 florets; involucre cobwebby; phyllaries 170, oblong-lanceolate, with short spines; achene obovate.

256. Cousiniopsis atractyloides (C. Winkl.) Nevski



Phytogeographical element: I-T Habitat: Semi-deserts, steppes Elevational range: 400 - 1100 Flowering period: IV - V

Remarks: Therophyte; plant up to 25 cm high; leaves spiny, pinnatifid, with 5–7(–9) lobes; capitula 7–10 mm in diameter, with 19–20 florets; spines of outer phyllaries 2

mm long.

257. Crepidifolium akagii (Kitag.) Sennikov

Synonyms: Youngia tenuicaulis (Babc. & Stebbins) Czerep.



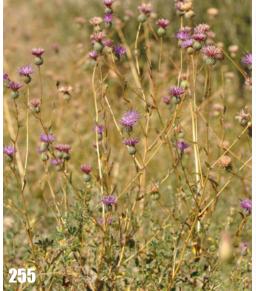
Phytogeographical element: EI-T, Orient

Habitat: Rocks, screes Elevational range: 1400 - 3900

Flowering period: VII - IX

Remarks: Cryptophyte; plant 10-25 cm high; stems dichotomously branched almost from base, glabrous; stem leaves often bractlike; capitula with 10-12 florets; phyllaries glabrous; achene black to blackish, fusiform,

with 10 ribs, shortly scabrid.

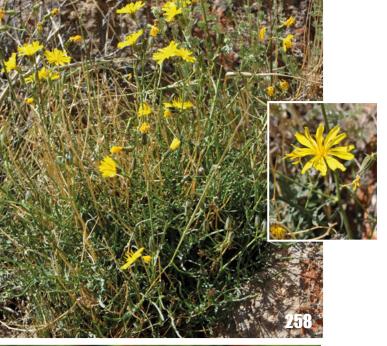
















258. Crepidifolium tenuifolium (Willd.) Sennikov

Synonyms: Youngia diversifolia (Ledeb.) Ledeb.



Phytogeographical element: EI-T

Habitat: Rocks, screes

Elevational range: 2700 - 4100 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 10–15(–25) cm high; capitula with 10–16 florets; phyllaries hairy; tubular corolla hairy;

achene hairy.

259. Crepis multicaulis Ledeb.



Phytogeographical element: I-T, E-S

Habitat: Alpine meadows, rocks, screes, alpine steppes

Elevational range: 1300 - 3900 Flowering period: VI - VII

Remarks: Cryptophyte; plant up to 40 cm high, with rhizome; basal leaves arranged in rosette; stems usually leafless; phyllaries abaxially covered with glandular hairs;

achene 3.5-4 mm long.

260. Crepis nicaeensis Balb. ex Pers.

Synonyms: Crepis flexuosa Kit.



Phytogeographical element: I-T

Habitat: Alpine semi-deserts, alpine steppes

Elevational range: 1900 - 4400 Flowering period: VI - VII

Remarks: Cryptophyte; plant 5–30 cm high; stem richly branched from base; capitula with 9–13 florets; phyllaries dark green (almost black); corolla tube glabrous; achene

with 10 ribs.

261. Crepis oreades Schrenk



Phytogeographical element: I-T

Habitat: Alpine meadows, alpine steppes, forbs

Elevational range: 2700 - 4200 Flowering period: VI - VII

Remarks: Cryptophyte; plant 10-25(-30) cm high; rosette with numerous leaves; stem leaves 0-2, +/- linear, reduced in size; phyllaries abaxially hairy, especially along

midvein; anther tube ca. 4 mm.

262. Crepis pulchra L.

Synonyms: Phaecasium pulchrum (L.) Rchb.



Phytogeographical element: I-T, E-S, M Habitat: Meadows, steppes, xeric shrubs, forbs

Elevational range: 750 - 2700 Flowering period: IV - VI

Remarks: Therophyte; plant up to 100 cm high; lower section of stem hispid and stipitate-glandular, upper section – glabrous; basal and lower stem leaves narrowly obovate; outer phyllaries 1-2 mm long, with broad

membranous margin; achene glabrous.

263. Crepis trichocephala (Krasch.) Krasch, ex V.V. Nikitin

Synonyms: Barkhausia trichocephala Krasch.

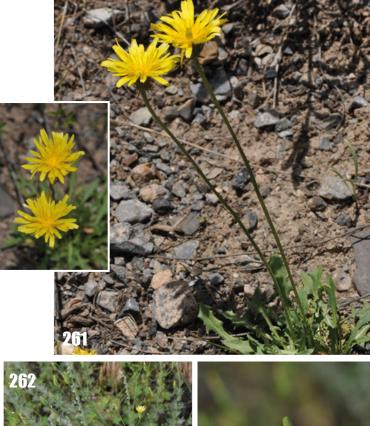


Phytogeographical element: I-T

Habitat: Broad-leaved forests, steppes, xeric shrubs,

thermophilous shrubs Elevational range: 400 - 2900 Flowering period: V - VI

Remarks: Therophyte; plant 15-40(-60) cm high; stems ribbed, purplish, poorly leafy; phyllaries covered with long, recurved, bristly hairs and short glandular hairs; inner achenes with beak 2 +/- longer than achene.



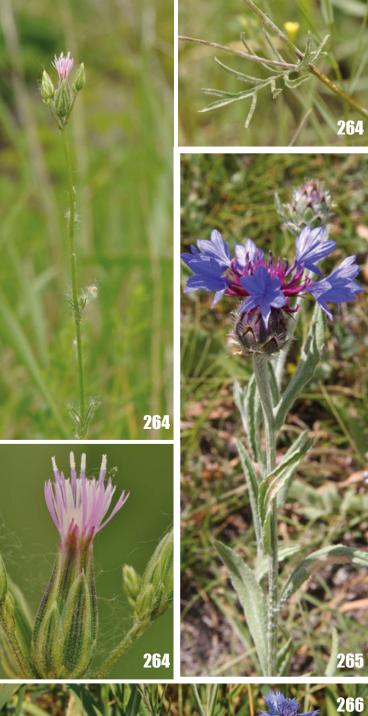














264. Crupina vulgaris Pers. ex Cass.



Phytogeographical element: I-T, M Habitat: Meadows, fields, steppes, forbs

Elevational range: 600 - 2000 Flowering period: IV - VI

Remarks: Therophyte; plant 20–60 cm high; stem solitary; stem leaves sessile, with 3–5 pairs of lateral lobes; involucre at anthesis fusiform to narrowly ellipsoid and 4–6 mm in diameter, expanding during fruiting; outer pappus elements to ca. 6 mm long, very unequal.

265. Cyanus depressus (M. Bieb.) Soják

Synonyms: Centaurea depressa Bieb.



Phytogeographical element: I-T, E-S Habitat: River beds, ruderal, fields Elevational range: 350 - 2800 Flowering period: V - VI

Remarks: Therophyte; plant 20–60 cm high, with greyish tomentum; leaves oblong-lanceolate or oblong-obovate, up to 2 cm wide; capitula 2–2.5 cm in diameter; outer and middle phyllaries ovate, with white, fimbriate margin; achene 5.5 mm long; pappus 6–8 mm long.

266. Cyanus segetum Hill

Synonyms: Centaurea cyanus L.



Phytogeographical element: Plurireg

Habitat: Fields

Elevational range: 800 - 2200 Flowering period: V - VII

Remarks: Therophyte, hemicryptophyte; plant 15–100 cm high, grayish-green; middle stem leaves lanceolate or narrowly lanceolate, entire, up to 1 cm wide; capitula 1–2.5 cm in diameter; outer and middle phyllaries ovate-oblong, with dark dentate-fimbriate margin; achene 4–5 mm long; pappus 3–4.5 mm long.

267. Cymbolaena griffithii (A. Gray) Wagenitz



Phytogeographical element: I-T Habitat: Screes, steppes Elevational range: 450 - 2100 Flowering period: IV - V

Remarks: Therophyte; plant with greyish tomentum; primary stem very short, branches procumbent, thus the whole plant usually appressed to the soil; leaves linear, acute; glomerules 10–20 mm in diameter; pappus bristles 1.5 mm long.

268. Doronicum turkestanicum Cavill.



Phytogeographical element: I-T

Habitat: Alpine meadows, alpine swards, moraines and

snow-beds, forbs

Elevational range: 3600 - 3650 Flowering period: VI - VII

Remarks: Cryptophyte; plant 25–80 cm high; basal leaves with 4–15 cm long, winged petiole; outer phyllaries linear-lanceolate or lanceolate; tube of ray florets densely glandular hairy; achenes in ray florets glabrous and without pappus, in disk florets adpressed hairy and with pappus.

269. Echinops acantholepis Jaub. & Spach

Synonyms: Acantholepis orientalis Less.



Phytogeographical element: I-T

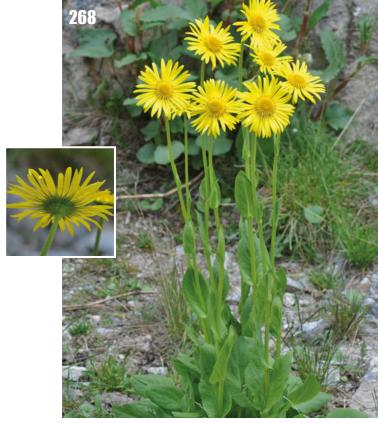
Habitat: river beds, semi-deserts, salt shrubs

Elevational range: 420 - 750 Flowering period: III - VI

Remarks: Plant 5–35 cm high; stem hairy; leaf blade lanceolate, cobwebby to lanate on both sides; pseudocephalia 1–1.4 cm in diameter; outer phyllaries 5–9 mm long; achene conical-oblong 4–5 mm long

covered with white hairs.













270. Echinops chloroleucus Rech. f.



Phytogeographical element: I-T

Habitat: River beds, loose sandy screes, screes

Elevational range: 1850 - 3100 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 30–90 cm high; stem covered with white hairs; leaves sessile, adaxially yellowis-green, gland-dotted; pseudocephalia 3–4 cm in diameter; outer phyllaries 6–7 mm long; achene fusiform, pubescent.

271. Echinops nanus Bunge



Phytogeographical element: I-T

Habitat: Screes, salt shrubs, salt marshes, steppes

Elevational range: 460 - 2450 Flowering period: VI - VII

Remarks: Therophyte; plant 20–50 cm high; stems and branches whitish to canescent, densely cobwebby to lanate; leaves grayish-white, cobwebby; pseudocephalia 2.5–3 cm in diameter; outer phyllaries 6–8 mm long; achene conical-oblong, covered with yellow hairs.

272. Echinops wakhanicus Rech. f.



Phytogeographical element: I-T

Habitat: Screes

Elevational range: 2800 - 2900

Flowering period: VI - VIII

Remarks: Cryptophyte; plant 40–100 cm high; lower and middle section of stem glandular, upper section – covered with dense, white hairs; leaves adaxially gland-dotted; pseudocephalia 5–6 cm in diameter; outer phyllaries 9–10 mm long; achene 9–10 mm long, oblong, covered with short yellow hairs.

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273. Epilasia mirabilis Lipsch.



Phytogeographical element: I-T

Habitat: Steppes

Elevational range: 400 - 1100

Flowering period: III

Remarks: Therophyte; plant 5–30(–40) cm high; stem leaves sessile; ray florets 2–4 cm long; phyllaries 0.5–2 cm long; outer phyllaries herbaceous, narrowly lanceolate, serrulate; inner phyllaries leatheary, broadly lanceolate with mambranous margin; achene 4–5 mm long.

274. Erigeron alexeenkoi (Krasch.) Botsch.

Synonyms: Psychrogeton alexeenkoi Krasch.



Phytogeographical element: I-T

Habitat: Rocks, screes

Elevational range: 2800 - 3600 Flowering period: VI - VII

Remarks: Cryptophyte; plant up to 10 cm high, densely pubescent with glandular hairs; leaves obovate or oblong-obovate; capitula 1.4–2.2 cm in diameter; ray florets as long as pappus or slightly longer; achene covered with glands and long glandular hairs.

275. Erigeron allochrous Botsch.



Phytogeographical element: EI-T Habitat: Alpine meadows Elevational range: 2200 - 2800 Flowering period: VI - IX

Remarks: Cryptophyte; plant um to 30 cm high; leaf margin entire, villous-ciliate; capitula solitary, up to 4 cm in diameter; phyllaries densely villous to lanate, eglandular, green or purplish in apex, often exceeding disk florets; achene (immature) densely strigose to silky.



















276. Erigeron aurantiacus Regel



Phytogeographical element: EI-T Habitat: Fens, alpine meadows Elevational range: 2100 - 3400 Flowering period: VI - IX

Remarks: Cryptophyte; plant up to 35 cm high; stem densely villous-hirsute; leaf margin entire, strigose; capitula solitary, up to 3.5 cm in diameter; phyllaries subequal, green and apically purplish, slightly exceeding disk florets, densely villous-hirsute; achene strigose.

277. Erigeron badachschanicus Botsch.



Phytogeographical element: E, I-T

Habitat: River beds

Elevational range: 2100 - 2600 Flowering period: VIII - IX

Remarks: Cryptophyte; plant 25–50 cm high; stem purplish; margin of basal leaves distantly serrate; capitula 1.2–1.5 cm in diameter; phyllaries purplish, covered with glandular hairs; ray florets glabrous; achene oblong-

lanceolate, pubescent.

278. Erigeron bellidiformis Popov



Phytogeographical element: E, I-T Habitat: Rocks, screes, alpine steppes Elevational range: 2700 - 3000 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 10–30 cm high; basal leaf apex obtuse; capitula 1.2–2 cm in diameter; phyllaries linear-lanceolate, covered with glandular hairs, with purplish apex; tube of ray florets hairy; achene lanceolate,

pubescent.

279. Erigeron cabulicus (Boiss.) Botsch.

Synonyms: Psychrogeton cabulicus Boiss.



Phytogeographical element: I-T

Habitat: Rocks, screes, alpine steppes, forbs

Elevational range: 1800 - 4000 Flowering period: VI - IX

Remarks: Cryptophyte; plant 6–30(–35) cm high; basal leaves lanceolate, acute, margin entire or distantly serrate; capitula up to 2.5 cm in diameter; ligule of ray lorets ovate or spatulate; ray florets distinctly longer than pappus.

280. Erigeron heterochaeta Botsch.



Phytogeographical element: I-T

Habitat: Screes, alpine steppes, moraines and snow-beds

Elevational range: 2400 - 5000 Flowering period: VI - VIII

Remarks: Cryptophyte; plant up to 20 cm high; basal leaves obovate, margin entire; capitula 3–5 cm in diameter; ray florets 1.3–2.1 cm long; corolla of disk florets hairy; all achene sterile obovate, pubescent.

281. Erigeron khorossanicus Boiss.



Phytogeographical element: I-T

Habitat: Steppes, xeric shrubs, thermophilous shrubs,

forbs

Elevational range: 1300 - 3400 Flowering period: VI - VII

Remarks: Cryptophyte, hemicryptophyte; plant 25–100 cm high; basal and lower stem leaves lanceolate; capitula 0.8–2 cm in diameter; teeth of disk florets covered with simple hairs; outer (female) florets with fertile achenes; inner (bisexual) florets with sterile achene; fertile achene

obovate, pubescent.







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282. Erigeron pamiricus Botsch. & Kochk.



Phytogeographical element: E, EI-T

Habitat: Rocks, screes, alpine semi-deserts, alpine steppes

Elevational range: 2700 - 4500 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 10–25 cm high; basal and lower stem leaves oblong-lanceolate; capitula 1.5–2 cm in diameter; plyllaries densely covered with long, multicellular hairs; disk florets with glabrous teeth; achene oblong-lanceolate, pubescent.

283. Erigeron petiolaris Vierh.



Phytogeographical element: E, I-T

Habitat: River beds, screes, xeric shrubs, forbs

Elevational range: 2000 - 4300 Flowering period: VI - VII

Remarks: Cryptophyte; plant up to 30 cm high; basal and lower stem leaves obovate; capitula 1.2–2.5 cm in diameter; phyllaries spreading outside, densely covered with long, multicellular hairs; achene lanceolate, densely pubescent.

284. Erigeron petroiketes Rech. f.

Synonyms: Erigeron pseudoneglectus Popov



Phytogeographical element: EI-T

Habitat: Screes, alpine semi-deserts, alpine steppes,

moraines and snow-beds Elevational range: 2200 - 4900 Flowering period: VII - VIII

Remarks: Cryptophyte; plant up to 20(–30) cm high; stem purplish; basal and lower stem leaves glabrous or with scattered hairs; capitula 1.5–2.8 cm in diameter; phyllaries covered with long hairs; achene oblong-lanceolate, pubescent.

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285. Erigeron poncinsii (Franch.) Botsch.

Synonyms: Psychrogeton poncinsii (Franch.) Ling & J.L. Chen



Phytogeographical element: I-T

Habitat: River beds, rocks, screes, steppes

Elevational range: 3300 - 4650

Flowering period: VI

Remarks: Cryptophyte; plant up to 20 cm high, tomentose; basal leaves lanceolate; capitula 1.6–2.5 cm in diameter; ray florets distinctly longer than pappus; tubular corolla

hairy; achene obovate, pubescent.

286. Erigeron popovii Botsch.



Phytogeographical element: I-T Habitat: Wet meadows, fens and mires

Elevational range: 200 - 3500 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 3–10 cm high; basal laves lanceolate, glabrous; capitula 1.2–1.6 cm in diameter; phyllaries glabrous, with purplish apex; disk florets with glabrous teeth; achene linear-lanceolate, pubescent.

287. Erigeron primuloides Popov

Synonyms: Psychrogeton primuloides (Popov) Grierson



Phytogeographical element: E, I-T

Habitat: Rocks, screes

Elevational range: 1500 - 3000 Flowering period: V - VII

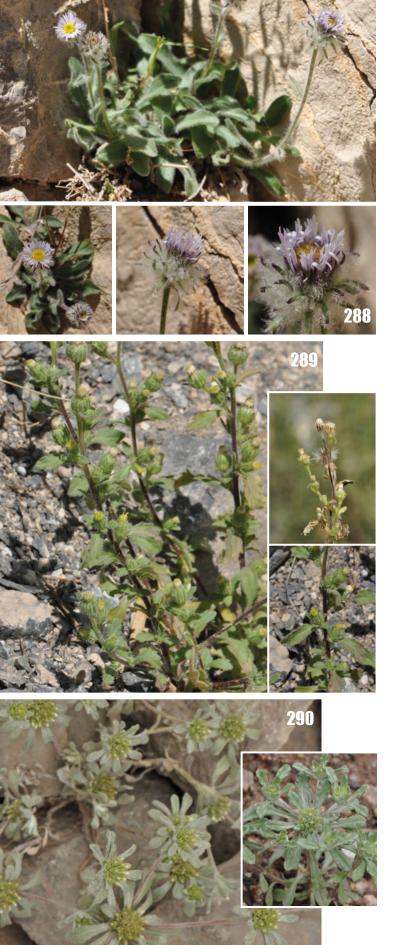
Remarks: Cryptophyte; plant up to 10 cm high, covered with glandular hairs; basal leaves obovate, apex obtuse or acute, margin serrate; capitula 1.5–2.2 cm in diameter; phyllaries with purplish apex; achene narrowly obovate,

with glandular hairs.









288. Erigeron sogdianus Popov



Phytogeographical element: E, I-T

Habitat: Loose sandy screes, screes, steppes

Elevational range: 2500 - 4100 Flowering period: VII - IX

Remarks: Cryptophyte; plant 2–16 cm high; basal leaver obtuse; capitula 1.4–2 mm in diameter; phyllaries densely pubescent, with purplish apex; ray florets glabrous; disk florets conical, with glabrous teeth; achene oblonglanceolate, covered with glandular hairs.

289. Erigeron umbrosus (Kar. & Kir.) Boiss.



Phytogeographical element: I-T Habitat: River beds, rocks, screes Elevational range: 1800 - 4000 Flowering period: VI - IX

Remarks: Therophyte; plant 5–35(–100) cm high, densely covered with short glandular and some long multicellular hairs; leaves obovate, up to 5 cm long; capitula 0.6–1 cm in diameter; corolla of ray florets pubescent, filiform; achene obovate, densely pubescent.

290. Filago hurdwarica (Wall. ex DC.) Wagenitz



Phytogeographical element: I-T

Habitat: Steppes

Elevational range: 1700 - 2400 Flowering period: IV - V

Remarks: Therophyte; plant 5–10 cm high; main stem with long prostrate to spreading lateral branches; leaves spathulate; bracts much longer than synflorescence; capitula 8–15 clustered; phyllaries in 3 series.

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291. Filago paradoxa Wagenitz



Phytogeographical element: I-T

Habitat: Steppes

Elevational range: 900 - 2200 Flowering period: IV - V

Remarks: Therophyte; plant up to 20 cm high; stem erect, dichotomously branched; leaves linear-lanceolate to narrowly spathulate; bracts slightly longet than synforescence, capitula 6–10 clustered; phyllaries in 2–3

series.

292. Filago pyramidata L.



Phytogeographical element: I-T, E-S, M Habitat: Ruderal, fields, steppes Elevational range: 400 - 2200 Flowering period: IV - V

Remarks: Therophyte; plant 5–30 cm high; stem with divergent branches, usually overtopping main stem; leaves oblong-spatulate; bracts slightly longer than synforescence; capitula 10–15 clustered; phyllaries in 5 series.

293. Galinsoga parviflora Cav.



Phytogeographical element: A; Plurireg Habitat: Arable fields, fallows, ruderal habitats

Elevational range: 700 - 2250 Flowering period: VI - VIII

Remarks: Therophyte; plant up to 60 cm high; stem glabrous at base; peduncle with few glandular hairs which

are less than 0.5 mm long.











294. Galinsoga quadriradiata Ruiz & Pav.



Phytogeographical element: A; Plurireg Habitat: Arable fields, fallows, ruderal habitats

Elevational range: 750 - 1250 Flowering period: VI - VIII

Remarks: Therophyte; plant up to 60 cm high; stem hairy below; peduncle with numerous glandular hairs which are

more than 0.5 mm long.

295. Garhadiolus hedypnois Jaub. & Spach

Synonyms: Rhagadiolus angulosus (Jaub. & Spach) Kupicha



Phytogeographical element: I-T, S-S, E-S, M Habitat: Fields, steppes, thermophilous shrubs

Elevational range: 600 - 2300 Flowering period: IV - V

Remarks: Therophyte; plant 5–20 cm high; basal and lower stem leaves oblong-obovate; capitula 3–5 mm in diameter, sessile or on very short peduncles; inner phyllaris glabrous or with bristles; achene apex with short bristles.

296. Gnaphalium luteoalbum L.

Synonyms: Laphangium luteoalbum (L.) Tzvelev



Phytogeographical element: I-T, E-S Habitat: River beds, meadows Elevational range: 2100 - 3350 Flowering period: V - VIII

Remarks: Therophyte; plant 10–25 cm high; leaves white-woolly on both sides; capitula in terminal clusters; involuclar bracts scarious, straw-coulored or whitish.

297. Handelia trichophylla (Schrenk) Heimerl



Phytogeographical element: I-T, E-S

Habitat: Fields, steppes, thermophilous shrubs

Elevational range: 650 - 3250 Flowering period: V - VII

Remarks: Cryptophyte; plant 40–100 cm high, densely white pilose in the lower part; lower leaves petiolate;

flowers ca. 2 mm long.

298. Helianthus annuus L.



Phytogeographical element: A; Plurireg Habitat: Fields, steppes, ruderal habitats

Elevational range: 500 - 1200 Flowering period: V - VII

Remarks: Therophyte; plant 100–300 cm high; stems erect, usually hispid; capitula large, 10–30 cm in diameter; disk

florets brown or purple.

299. Helichrysum maracandicum Popov



Phytogeographical element: I-T

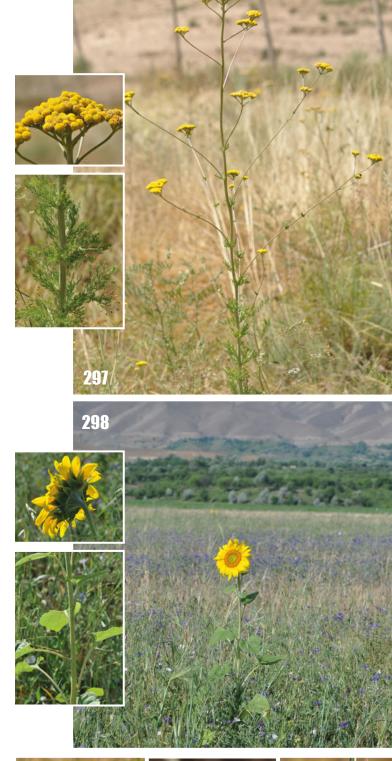
Habitat: Loose sandy screes, screes, steppes, forbs

Elevational range: 600 - 2500 Flowering period: VI - VII

Remarks: Cryptophyte; plant 15–35(–75)cm high; capitula with 60–75 florets; phyllaries greenish-yellow; pappus

consisted of 20-25 hairs.

Usefulness: Med.











300. Helichrysum mussae Nevski



Phytogeographical element: E, I-T Habitat: Screes, steppes Elevational range: 800 - 3000 Flowering period: VI - VII

Remarks: Cryptophyte; plants 15–30(–45) cm high; capitula with 25–30 florets; phyllaries brownish; pappus

consisted of 22-25 hairs.

301. Helichrysum thianschanicum Regel



Phytogeographical element: I-T Habitat: Steppes, forbs Elevational range: 1800 - 3100 Flowering period: VI - VII

Remarks: Cryptophyte; plant 15–45(–60) cm high; capitula with 25 florets; phyllaries yellow; pappus consisted of

30-40 hairs.

302. Heteracia szovitsii Fisch. & C.A. Mey.



Phytogeographical element: I-T, E-S

Habitat: Screes, steppes, xeric shrubs, thermophilous

shrubs, forbs

Elevational range: 400 - 2600 Flowering period: III - IV

Remarks: Therophyte; plant 5–30(–40) cm high, glabrous; capitula with 20–50 florets; outer phyllaries 2–5,

triangular, 1-2 mm long; inner phyllaries ca. 8, lanceolate,

3-8 mm long.

303. Hieracium robustum Fr.



Phytogeographical element: I-T, E-S, Orient Habitat: Broad-leaved forests, forbs Elevational range: 1700 - 3100

Flowering period: VI - VII

Remarks: Cryptophyte; plant 40–80(–120) cm high; stem basally purple; leaves often with rigid simple hairs on margin; synflorescence with (10–)15–50(–80) capitula;

phyllaries green or dark green.

304. Hieracium virosum Pall.



Phytogeographical element: I-T, M, E-S

Habitat: Broad-leaved forests, steppes, xeric shrubs, forbs

Elevational range: 2000 - 2500 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 40–80(–120) cm high; stem basally purple; leaves abaxially pale green, distinctly reticulately veined, with dense to sparse +/- setose simple hairs; synflorescence with (10–)15–50(–80) capitula;

phyllaries dark green.

305. Hippolytia darvasica (C. Winkl.) Poljakov



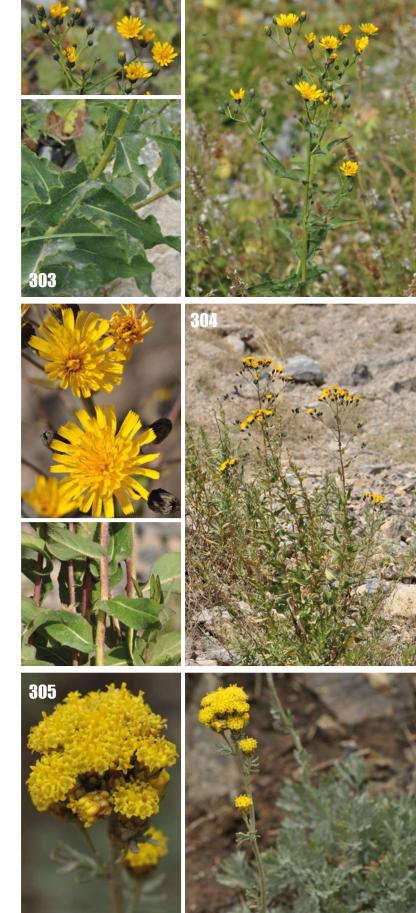
Phytogeographical element: I-T

Habitat: Rocks, screes

Elevational range: 2300 - 3700 Flowering period: VII - IX

Remarks: Cryptophyte; plant 10–50 cm high, grayish, covered with dense branched hairs; leaves glandular; capitula in dense spherical synflorescence; phyllaries with brown membranous margin; outer phyllaries hairy, inner

phyllaries glabrous.













306. Inula glauca C. Winkl.



Phytogeographical element: E, I-T

Habitat: Rocks, screes

Elevational range: 1500 - 2500 Flowering period: VI - VII

Remarks: Cryptophyte; plant 15–30 cm high, covered with glandular and eglandular hairs; leaves sessile and eliptical, ovate-oblong; capitula 3–4 cm in diameter; phyllaries almost equal; corolla tube of ray florets hairy; achene cylindrical.

307. Inula grandiflora Willd.

Synonyms: Inula orientalis Lam., I. macrophylla Kar. & Kir.



Phytogeographical element: I-T Habitat: Thermophilous shrubs, forbs Elevational range: 750 - 2500

Flowering period: V - VI

Remarks: Cryptophyte; plant 50–200 cm high; leaves abaxially glandular, veins covered with white, multicellular hairs; capitula 4.5–6.5 cm in diameter; outer phyllaries ovate-lanceolate, densely covered with glandular hairs; achene cylindrical.

Usefulness: Med, For.

308. Inula macrolepis Bunge



Phytogeographical element: E, I-T

Habitat: River beds

Elevational range: 800 - 1000 Flowering period: VI - VII

Remarks: Hemicryptophyte; plant 40–50 cm high; leaves, acute, distancly serrete, abaxially covered with long hairs; capitula 2.5–3 cm in diameter; outer phyllaries spreading outside, covered with long, eglandular hairs; pappus as

long as tubular corolla.

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309. Inula rhizocephala Schrenk



Phytogeographical element: I-T Habitat: Fens and mires, pastures Elevational range: 1200 - 3900 Flowering period: VI - VII

Remarks: Cryptophyte; plants acaulescent; leaves numerous, oblong or oblong-obovate; capitula 1.5-3 cm in diameter; numerous, densely congested, encircled by rosette of leaves.

310. Inula schischkinii Gorschk.



Phytogeographical element: E, I-T

Habitat: Rocks

Elevational range: 1900 - 3400 Flowering period: VI - VII

Remarks: Cryptophyte; plant 25–50 cm high; leaves sessile, ovate to oblong; capitula 1.5–2.5 in diameter; inner phyllaries almost 3 × longer than outer; ray florets

glandular; achene cylindrical.

311. Inula schmalhausenii C. Winkl.



Phytogeographical element: E, EI-T

Habitat: Rocks

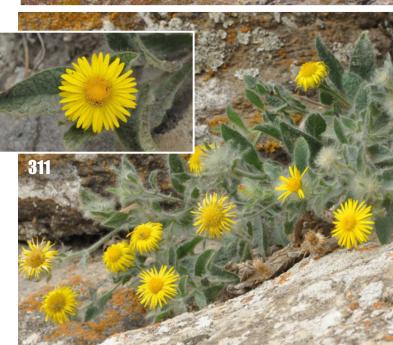
Elevational range: 2500 - 3600 Flowering period: VI - VII

Remarks: Cryptophyte; plant 5-30 cm high, covered with woolly hairs, eglandular; leaves ovate-lanceolate; capitula 4–5 cm in diameter; outer and inner phyllaries almost

equal; ray florets hairy; achene linear.













312. Jurinea abramowii Regel & Herder



Phytogeographical element: I-T Habitat: Screes, alpine steppes Elevational range: 2100 - 3500 Flowering period: VI - VII

Remarks: Cryptophyte; plant 5–10 cm high, grayish green; basal leaves, pinnatifid, with narrow lobes; capitula 3–4 cm in diameter; phyllaries acute, at least outer recurved in apical part; pappus 1–1.5 cm long.

313. Jurinea bipinnatifida C. Winkl.



Phytogeographical element: E, I-T

Habitat: Steppes, thermophilous shrubs, forbs

Elevational range: 700 - 1100

Flowering period: V

Remarks: Cryptophyte; plant 25–80 cm high; terminal lobe of lower leaves larger than lateral lobes; phyllaries sharply recurved, appex attenuate; capitula 2.5–5 cm in diameter; corolla glandular; pappus 1.2–1.5 cm long.

314. Jurinea bucharica C. Winkl.



Phytogeographical element: E, I-T Habitat: Rocks, screes, steppes Elevational range: 400 - 800 Flowering period: V - VI

Remarks: Cryptophyte; plant 20–40 cm high; caudex covered with dry residues of leaves; petiole of basal leaves slightly expanded; basal leaves pinnatilobate; capitula 0.5–1.2 cm in diameter; involucre narrowly cup-shaped;

pappus 1.8-2 cm long.

315. Jurinea lanipes Rupr.



Phytogeographical element: , EI-T

Habitat: Steppes

Elevational range: 3700 - 4200

Flowering period: VI

Remarks: Cryptophyte; plant 20–30 cm high, leaves pinnatifid (with 3–5 pairs of lateral lobes), arranged in rosette; capitila 3.5–4 cm in diameter; outer and middle phyllaries slightly recurved; pappus 1.3–1.5 cm long.

316. Jurinea maxima C. Winkl.



Phytogeographical element: E, I-T

Habitat: Screes

Elevational range: 1600 - 1800

Flowering period: VI

Remarks: Cryptophyte; plant 25–80 cm high; terminal lobe of lower leaves not larger than lateral lobes; phyllaries covered with short bristles and glandular, sharply recurved, appex attenuate; capitula 3–6 cm in diameter;

corolla glandular; pappus up to 1 cm long.

317. Jurinea narynensis Kamelin & Tscherneva



Phytogeographical element: I-T Habitat: Steppes, screes Elevational range: 1000 - 1800 Flowering period: V - VII

Remarks: Cryptophyte; plant 20–35 cm high; caudex covered with residues of old shoots; stem branched from base; stem leaves linear, 2–3 mm wide, margin revolute; capitula solitary, ovate; phyllaries lanceolate, keeled.















318. Jurinea olgae Regel & Schmalh.



Phytogeographical element: I-T Habitat: Rocks, screes, steppes Elevational range: 1300 - 2300 Flowering period: VI - VII

Remarks: Cryptophyte; plant 25–30(–40) cm high; stem richly branched; leaves linear, margin entire; capitula 0.7–1 cm in diameter; involucre narrowly cylindrical or narrowly cup-shaped; pappus 1–1.2 cm long.

319. Jurinea thianschanica Regel & Schmalh.



Phytogeographical element: EI-T Habitat: Alpine semi-deserts, steppes Elevational range: 1200 - 2400 Flowering period: V - VII

Remarks: Cryptophyte; plant 25–45 cm high; stem arachnoid, branched from base; leaves linear or oblong; involucre 2.5 cm wide; outer phyllaries acuminate, glandular, bent down; achene 3–4(–5) mm long,

quadrangular in cross section.

320. Kalimeris altaica (Willd.) Nees ex C.A. Mey. & Avé-Lall.

Synonyms: Heteropappus canescens (Ness) Novopokr.



Phytogeographical element: I-T

Habitat: Ruderal, fields, steppes, thermophilous shrubs,

forbs

Elevational range: 650 - 2800 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 30–85 cm high; leaves oblong-lanceolate or linnear, densely pubescent; lower stem leaves early withering; capitula 2–3.5 cm in diameter; ray florets 14–15(–22), with ligula 9–12 mm

long; pappus 4–6 mm long.

Usefulness: For.

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321. Karelinia caspia (Pall.) Less.



Phytogeographical element: I-T

Habitat: Fields, salt shrubs, salt marshes

Elevational range: 350 - 700 Flowering period: VI - VII

Remarks: Cryptophyte; plant up to 1.5 m high; leaves oblong; capitula 0.8–2 cm in diameter, arranged in terminal corymbiform synflorescences; outer phyllaries ovate or ovate-oblong; ray florets with filiform corolla,

pappus 0.9-1.4 cm long.

322. Koelpinia linearis Pall.



Phytogeographical element: I-T, M, E-S

Habitat: Pastures, screes, steppes, thermophilous shrubs,

forbs

Elevational range: 400 - 3300 Flowering period: IV - VI

Remarks: Therophyte; plant 5–30 cm high; stem leaves linear; capitula 3 mm in diameter, with 5–9 florets; achene columnar-scorpioid, abaxially and apically covered with

hooked, needlelike spines.

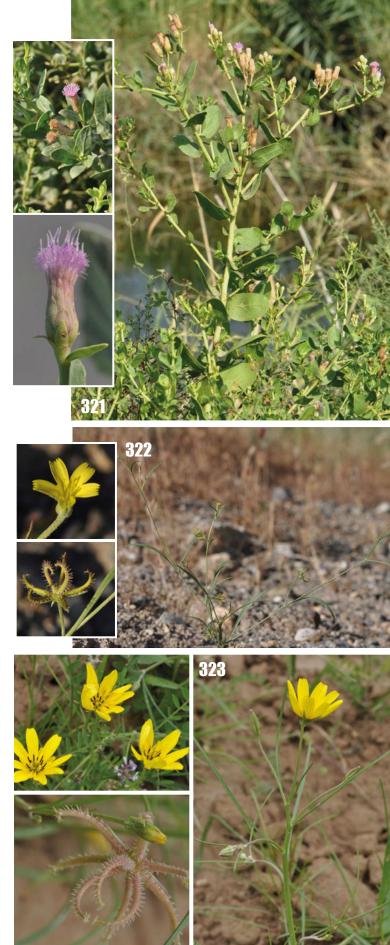
323. Koelpinia macrantha C. Winkl.

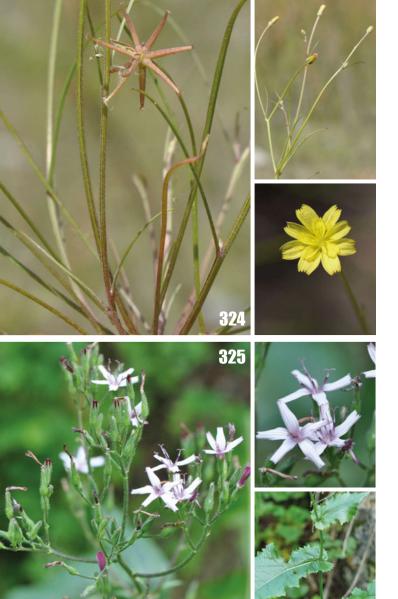


Phytogeographical element: I-T Habitat: Meadows, steppes, forbs Elevational range: 300 - 1300 Flowering period: III - V

Remarks: Therophyte; plant 10–35 cm high; leaves linear; capitula 7–8 mm in diameter; achene annularly curved, glandular, with furrows, abaxially and apically covered

with hooked, needlelike spines.







324. Koelpinia tenuissima Pavlov & Lipsch.



Phytogeographical element: I-T

Habitat: Loose sandy screes, screes, nitrophilous rock

footings, steppes

Elevational range: 300 - 2800 Flowering period: IV

Remarks: Therophyte; plant 5–25 cm high; leaves filiform; capitula up to 2 mm in diameter; achene linear-cylindrical, straight, only apically covered with hooked spines.

325. Kovalevskiella kovalevskiana (Kirp.) Kamelin

Synonyms: Cicerbita kovalevskiana Kirp.



Phytogeographical element: I-T Habitat: Forbs, deciduous forests Elevational range: 1200 - 2500 Flowering period: VII - VIII

Remarks: Cryptophyte; plant up to 110 cm high; petiole of lower leaves long, broadly winged, semi-amplexicaul; capitula cylandrical, with 5 flowers; phyllaries covered with glandular hairs; achene oblong cylindrical or

lanceolate.

326. Lachnophyllum gossypinum Bunge



Phytogeographical element: I-T Habitat: Ruderal, fields, steppes Elevational range: 300 - 1400 Flowering period: VII - X

Remarks: Therophyte; plant 10–80 cm high, covered with dense, soft hairs; basal leaves early withering; lower stem leaves obovate; capitula 1.8–2.3 in diameter; outer phyllaries less than 1 mm wide, pubescent; corolla of ray

florets pobescent; pappus 5.5-6 mm long.

Usefulness: Med, For.

327. Lactuca crambifolia (Bunge) Boiss.

Synonyms: Steptorhamphus crambifolius Bunge



Phytogeographical element: I-T Habitat: Rocks, screes, forbs Elevational range: 600 - 2800 Flowering period: IV - VI

Remarks: Cryptophyte; plant (15–)30–50 cm high; basal leaves 20–30 cm long; peduncle glabrous; capitula 2–2.5 cm in diameter; phyllaries glabrous or only outer phyllaries covered with non-glandular hairs; pappus 7–11 mm long.

328. Lactuca glauciifolia Boiss.



Phytogeographical element: I-T

Habitat: River beds, loose sandy screes, screes

Elevational range: 550 - 2900 Flowering period: III - VII

Remarks: Therophyte; plant 7–15 (–20) cm high; stem glabrous; leaves grayish, abaxially covered with long, white hairs; basal leaves obovate or spatulate, arranged in rosette; capitula 5 mm in diameter; phyllaries covered with long, white hairs; pappus 2.5–3 mm long.

329. Lactuca orientalis (Boiss.) Boiss.

Synonyms: Scariola orientalis (Poiss.) Soják



Phytogeographical element: I-T, S-S, E-S Habitat: Rocks, screes, fields, steppes Elevational range: 850 - 3900

Flowering period: VI - IX

Remarks: Cryptophyte; plant 20–60 cm high; base of lower stem leaves with white tomentose hairs; outer phyllaries ovate, red in apical part; tubular corolla hairy; achene 7–8

mm long, compressed; pappus 7–9 mm long.











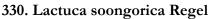












Synonyms: Cephalorrhynchus soongoricus (Regel) Kovalevsk.



Phytogeographical element: I-T

Habitat: Juniper forests, broad-leaved forests, xeric shrubs,

thermophilous shrubs, forbs Elevational range: 800 - 3000 Flowering period: IV - VII

Remarks: Cryptophyte; plant 50–80 cm high; stem purplish (mostly at base), glabrous in upper part; synflorescence paniculiform; capitula 3–5 mm in diameter; inner phyllaries with purplish margin; achene laterally furrowed; pappus up to 5 mm long.

331. Lactuca tatarica (L.) C.A. Mey.



Phytogeographical element: I-T, E-S, Himal

Habitat: River beds, riverside forests, fens and mires,

littoral vegetation

Elevational range: 400 - 3900 Flowering period: V - IX

Remarks: Cryptophyte; plant 30–80(–100) cm high; lower and middle stem leaves usually pinnately lobed, base usually narrowed and semiamplexicaul; capitula up to 2.5 cm in diameter; achene without prominent beak;

pappus 9-12 mm long.

332. Lactuca undulata Ledeb.



Phytogeographical element: I-T, M, E-S

Habitat: River beds, screes, steppes, thermophilous

shrubs, forbs

Elevational range: 500 - 3400 Flowering period: IV - VII

Remarks: Therophyte; plant 10–30(–60) cm high; leaves glaucous green; lower and middle stem leaves oblanceolate to narrowly elliptic; capitula 1 cm in diameter, with 8–12 flowers; beak of achene 10–12 mm,

base with rodlike appendages.

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333. Launaea procumbens (Roxb.) Ramayya & Rajagopal

Synonyms: Paramicrorhynchus procumbens (Roxb.) Kirp.



Phytogeographical element: I-T, M, S-S Habitat: River beds, fields, salt marshes

Elevational range: 350 - 1400 Flowering period: IV - VI

Remarks: Cryptophyte, hemicryptophyte; plant up to 30(-80) cm high; most leaves arranged in rosette; outer phyllaries triangular-ovate; inner phyllaries oblong or linear; ligula as long as corolla tube; corolla tube pubescent; achene 3 mm long.

334. Leontopodium brachyactis Gand.



Phytogeographical element: I-T, M

Habitat: Broad-leaved forests, steppes, thermophilous

shrubs

Elevational range: 2900 - 3000 Flowering period: VI - VII

Remarks: Cryptophyte; plant up to 15 cm high; basal leaves broadly spathulate, with promiment midvein, obtuse; bracts similar to stem leaves; capitula 6–8 mm in

diameter, 3–5-clustered; pappus 5 mm long.

335. Leontopodium ochroleucum Beauverd



Phytogeographical element: I-T, E-S

Habitat: Alpine meadows, fens and mires, alpine swards

Elevational range: 3500 - 4900 Flowering period: V - VII

Remarks: Cryptophyte; plant 10-15(-25) cm high; rosette leaves oblong-spatulate or narowly oblong; bracts differ from stem leaves, whitish-yellow, $1.5-2 \times longer$ than synflorescence; capitula 5-7(-12) clustered, 5-7 mm in diameter.

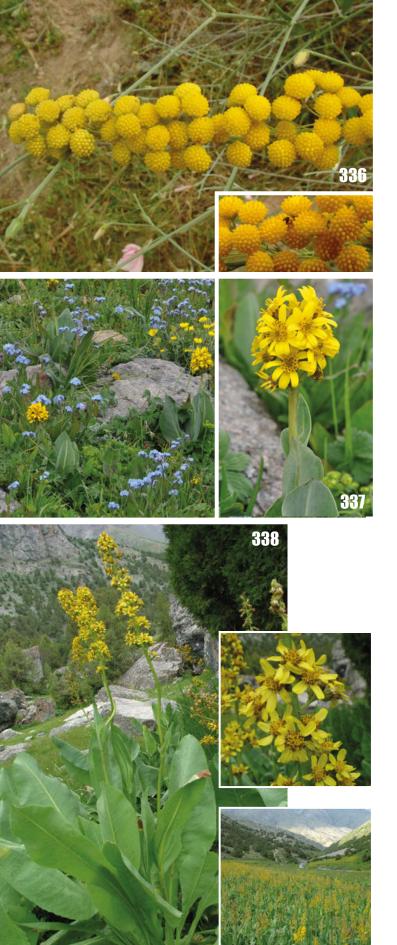












336. Lepidolopsis turkestanica (Regel & Schmalh.) Poljak



Phytogeographical element: I-T

Habitat: Termophilous shrubs, steppes, screes, ruderal,

fallows

Elevational range: 800 - 2300 Flowering period: V - VIII

Remarks: Cryptophyte; plant 40–80(–100) cm high; leaves composed of narowly linnear or lineal-lanceolate lobes; synflorescence 15–30 cm long; capitula 4–6 mm in diameter; inner phyllaries with white membranous margin.

337. Ligularia alpigena Pojark.



Phytogeographical element: I-T

Habitat: Alpine meadows, fens and mires, alpine swards,

pastures

Elevational range: 2800 - 4250 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 15–50(–80) cm high, grayish green; basal and lower stem leaves ovate or eliptical, attenuate; synflorescence composef of 5–20 capitula; ray florets 7–12, 6–12 mm long; pappus white as long as tubular corolla.

338. Ligularia heterophylla Rupr.



Phytogeographical element: I-T

Habitat: Alpine meadows, pastures, forbs

Elevational range: 1750 - 3400 Flowering period: VI - VII

Remarks: Cryptophyte; plant up to 200 cm high, grayish green; basal leaves 2, eliptical or oblong, up to 50 cm long; synflorescence up to 50 cm; ray florets 3–5, 11–15

mm long, pappus shorther than achene.

339. Ligularia karataviensis (Lipsch.) Pojark.



Phytogeographical element: EI-T

Habitat: Alpine meadows, screes, steppes, forbs

Elevational range: 3300 - 3400 Flowering period: VI - VII

Remarks: Cryptophyte; plant up to 40 cm high; leaves round or cordate; synflorescence composed of 3–7 capitula; ray florets ca. 10; 15–20 mm long.

340. Ligularia thomsonii (C.B. Clarke) Pojark.



Phytogeographical element: I-T

Habitat: Juniper forests, xeric shrubs, forbs

Elevational range: 1500 - 3500 Flowering period: VI - VII

Remarks: Cryptophyte; plant up to 200 cm high; leaves triangular-cordate, abaxially sparsely white lanate, adaxially glabrous; synflorescence 10–35 cm long, composed of numerous capitula; ray florets 1–3 (–4–5), 12–22 mm long; pappus as long as achene.

341. Limbarda salsoloides (Turcz.) Ikonn.



Phytogeographical element: I-T Habitat: Semi-deserts, salt marshes Elevational range: 1400 - 2800 Flowering period: VI - VII

Remarks: Cryptophyte; plant 15–35(–60) cm high; stem base covered with white hair, upper part of stem glabrous; leaves sessile, margin revolute; ray florets 1.1–1.3 cm

long; achene gland-dotted.

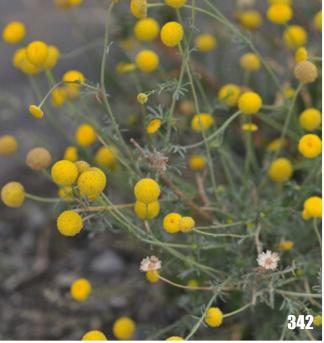


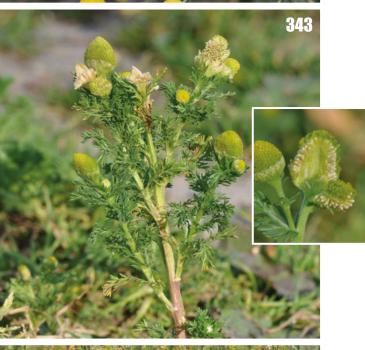














342. Matricaria aurea (Loefl.) Sch. Bip.

Synonyms: Lepidotheca aurea (L.) Kovalevsk.



Phytogeographical element: Plurireg

Habitat: Semi-deserts, salt shrubs, salt marshes

Elevational range: 350 - 1100 Flowering period: V - VI

Remarks: Therophyte; plant 5–15(–20) cm high; leaves up to 3 cm long; capitula solitary, 4–6(–8) mm in diameter; all florets tubular; receptacle ovate; pappus absent.

343. Matricaria discoidea DC.

Synonyms: Chamomilla suaveolens (Pursh) Rydb.



Phytogeographical element: Plurireg

Habitat: Ruderal

Elevational range: 500 - 1600 Flowering period: IV - VI

Remarks: Therophyte; plant 15–35 cm high; leaves up to 6 cm long; capitula 8-9 mm in diameter, arranged in synflorescences; receptacle conical-oblong; pappus

present.

344. Neopallasia pectinata (Pall.) Poljakov

Synonyms: Artemisia pectinata Pall.



Phytogeographical element: EI-T, E-S Habitat: Semi-deserts, steppes

Elevational range: 1300 - 3400 Flowering period: VII - X

Remarks: Cryptophyte; plant up to 40 cm high; stems erect, purplish; synflorescence of short axillary spikes grouped into a slender, leafy panicle; phyllaries with broad scarious margin; achenes brown, eliptic, somewhat compressed.

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Asteraceae

345. Onopordum acanthium L.



Phytogeographical element: I-T, M, E-S

Habitat: Ruderal, fields Elevational range: 600 - 2000 Flowering period: VI - IX

Remarks: Hemicryptophyte; plant up to 200 cm high; stem winged; wings with yellowish-brown spines; capitula (2–)3–5 cm in diameter; outer and middle phyllaries with divaricate to reflexed apex; achene 4–6 mm long, pappus

bristles scabrid, 1.1–1.3 cm long.

Usefulness: Med, Foo.

346. Onopordum leptolepis DC.



Phytogeographical element: I-T, M, E-S Habitat: Ruderal habitats, arable fields

Elevational range: 600 - 3000 Flowering period: V - VIII

Remarks: Hemicryptophyte; plant 60–100 cm high; stem winged; wings with yellow spines; capitula 5–10 cm in diameter; phyllaries straight; achene 6–6.6 mm long;

pappus bristles plumose, 2–2.5 cm long.

347. Pentanema albertoregelia (C. Winkl.) Gorschk.



Phytogeographical element: I-T

Habitat: Rocks

Elevational range: 1600 - 2600 Flowering period: VI - VII

Remarks: Cryptophyte; plant 10–20 cm high; capitula 1–3(–6); outer phyllaries lanceolate, apex acuminate; disk florets almost as long as ray florets, achene up to 1 mm

long.





348. Pentanema divaricatum Cass.



Phytogeographical element: I-T, M

Habitat: Fields, steppes Elevational range: 500 - 1100 Flowering period: V - VI

Remarks: Therophyte; plant 10–25 cm high, covered with dense, long hairs; capitula numerous; outer phyllaries spatulate, apex obtuse; disk florets 1.5 × shorter than ray

florets.

349. Picnomon acarna (L.) Cass.



Phytogeographical element: I-T, M, E-S

Habitat: River beds, screes Elevational range: 400 - 2700 Flowering period: VII

Remarks: Therophyte, hemicryptophyte; plant 15–60 cm high, stem narrowly winged; middle and upper leaves abaxially with reticulate venation; capitula 3–4 cm in diameter; outer phyllaries leafy; pappus of silky hairs.

350. Picris nuristanica Bornm.



Phytogeographical element: I-T

Habitat: Broad-leaved forests, steppes, forbs

Elevational range: 1400 - 3400 Flowering period: VI - IX

Remarks: Therophyte, hemicryptophyte; plant 35–85(–120) cm high; stem covered with whitish 2-hooked hairs; basal leaves and lower stem leaves lanceolate or oblong; capitula 0.7–1 cm in diameter; phyllaries dark green, arachnoid hairy and with whitish rigid 2-hooked hairs.

351. Pilosella procera (Fr.) F.W. Schultz& Sch. Bip.

Synonyms: Hieracium procerum Fries



Phytogeographical element: I-T, E-S

Habitat: Broad-leaved forests, alpine meadows, xeric

shrubs, forbs

Elevational range: 1700 - 3250 Flowering period: VI - VII

Remarks: Cryptophyte; plant 40–70(–100)cm high, stems covered with stellate and bristly hairs; leaves yellowish green; lower and middle stem leaves oblong-lanceolate; synflorescence loose; capitula 1–1.2 cm in diameter;

phyllaries lanceolate; achene ribbed.

352. Polychrysum tadshikorum (Kudr.) Kovalevsk.



Phytogeographical element: I-T

Habitat: River beds, rocks, screes, steppes

Elevational range: 500 - 2300 Flowering period: V - VII

Remarks: Cryptophyte; plant 25–150 cm high; caudex covered with dry residues of leaves and felty hairs; leaves 3- or 4-pinnatisect, felted; synflorescence composed of 30–50 capitula; capitula 3–4.5 mm in diameter; phyllaries felty or almost glabrous.

353. Pseudohandelia umbellifera (Boiss.) Tzvelev



Phytogeographical element: I-T Habitat: Screes, ruderal, fields, steppes

Elevational range: 400 - 1000 Flowering period: IV - VI

Remarks: Cryptophyte; plant up to 20–90 cm high; basal leaves numerous at anthesis; leaves (2–)3-pinnatisect; synflorescence composed of 10–85 capitula; capitula 6–10

mm in diameter; phyllaries glabrous.

Usefulness: Med.













354. Psychrogeton amorphoglossus (Boiss.) Novopokr.

Synonyms: Psychrogeton leucophyllus (Bunge) Novopokr.



Phytogeographical element: I-T Habitat: Rocks, screes

Elevational range: 2300 - 3500 Flowering period: VII - VIII

Remarks: Cryptophyte; plant up to 15 cm high, grayish-green; leaves obovate or oblong-eliptical; capitula 1.3–2.2 cm in diameter; ray florets +/- as long as pappus; achene covered with long white hairs, slightly glandular.

355. Psychrogeton andryaloides DC.

Synonyms: Erigeron andryaloides (DC.) Benth



Phytogeographical element: I-T Habitat: Rocks, screes, steppes Elevational range: 1700 - 4100 Flowering period: V - VII

Remarks: Cryptophyte; plant up to 15 cm high, covered with long villous and short glandular hairs; basal leaves ovate or spatulate, margin distantly serrate; capitula 1.6–2 cm in diameter; ray florets clearly longer than pappus.

356. Pulicaria dysenterica (L.) Gaertn.

Synonyms: Pulicaria uliginosa Stef. ex DC.



Phytogeographical element: I-T

Habitat: River beds, fens and mires, littoral vegetation

Elevational range: 550 - 1800 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 20–60 cm high; leaves sessile, oblong, apex acute, base cordate and slightly amplexicaul; phyllaries in 5 or 6 series; ray florets almost 3 × as long as tubular disk florets; corolla sparsely glandular outside.

Usefulness: Med.

357. Pulicaria salviifolia Bunge



Phytogeographical element: I-T

Habitat: River beds, loose sandy screes, screes, ruderal

Elevational range: 550 - 2300 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 30–60 cm high, grayish tomentose, with a pleasant smell; leaves obovate-spatulate, apex rounded, base narrower; phyllaries in 2 or 3 series, slightly pubescent; corolla sparsely glandular outside.

358. Pyrethrum karelinii Krasch.



Phytogeographical element: EI-T

Habitat: Rocks, screes, moraines and snow-beds

Elevational range: 3000 - 4450 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 10–35 cm high; leaves pinnatifid, with pinnatifid lobes; capitula 3–5 cm in diameter; ligule of ray florets 12–22 mm long; achene with

5–8 ribs.

Usefulness: Orn.

359. Pyrethrum leontopodium (C. Winkl.) Tzvelev



Phytogeographical element: EI-T Habitat: Rocks, screes Elevational range: 3200 - 4800 Flowering period: VII - IX

Remarks: Cryptophyte; plant 5–15 cm high, densely white tomentose; blade of basal leaves 2–3 pinnatisect; involucre 10–20 mm in diameter; phyllaries lanceolate with black-

brown margin; achenes with 7-10 ribs.













360. Pyrethrum pyrethroides (Kar. & Kir.) B. Fedtsch. ex Krasch.



Phytogeographical element: EI-T

Habitat: Rocks, screes

Elevational range: 2000 - 4500 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 5–25(–35) cm high, arachnoid hairy; blade of basal leaves bipinnatisect into lanceolate, hyaline-mucronulate ultimate segments; involucre 7–15 mm in diameter; phyllaries with backish-brown margin; ligule of ray florets 7–15 mm long; achene with 5–9 ribs.

Usefulness: Orn.

361. Pyrethrum semenovii (Herder) C.G.A. Winkl. ex O. Fedtsch. & B. Fedtsch.



Phytogeographical element: EI-T Habitat: Rocks, screes, alpine steppes Elevational range: 2600 - 3800 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 10–35 cm tall, sparsely villous; basal leaves with petioles up to 2 cm long; leaf blade narrowly elliptic, 3-pinnatisect; phyllaries in 4 rows, outer phyllaries long ovate-triangular, inner ones narrowly lanceolate; achene 2.3–3 mm long, with 6–8 ribbs.

362. Rhaponticum repens (L.) Hidalgo

Synonyms: Acroptilon repens (L.) DC.



Phytogeographical element: Plurireg Habitat: Ruderal, fields, steppes, forbs

Elevational range: 350 - 3600 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 15–80 cm high; leaves oblong, lanceolate or linear-lanceolate; capitula up to 1.5 cm in diameter; involucre ovate; phyllaries with bright membranous appical appendages; achene white.

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363. Rhinactinidia limoniifolia (Less.) Novopokr. ex Botsch.

Synonyms: Krylovia limoniifolia (Less.) Schischk.



Phytogeographical element: I-T

Habitat: Rocks

Elevational range: 1200 - 3500 Flowering period: VI - VIII

Remarks: Cryptophyte; plants up to 25 cm high; stems strigose; basal leaves spatulate to obovate or oblanceolate, strigose, margin entire or sparsely serrulate, apex obtuse or rounded; capitula solitary, 1.5–2 cm in diameter; phyllaries in 3 series; achene densely strigose.

364. Rhinactinidia popovii (Botsch.) Botsch.



Phytogeographical element: I-T

Habitat: Rocks

Elevational range: 1400 - 2600 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 5–30 cm high, grayish; rossete leaves obovate or broadly eliptical; capitula 1–1.5 cm in diameter; phyllaries covered with (eglandular and glandular) hairs and gland-dotted; ray florets 4–5 mm long, corolla tube greenish, covered with short hairs.

365. Richteria djilgense (Franch.) K. Bremer & Humphries

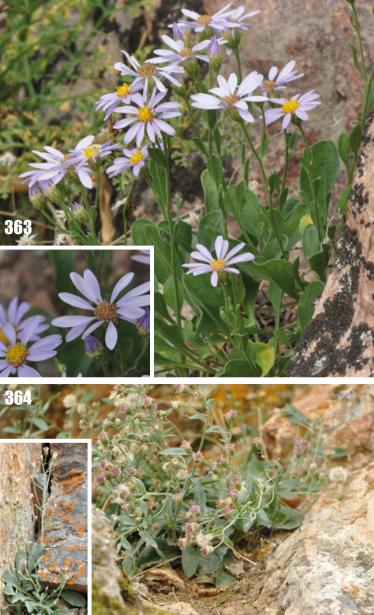
Synonyms: Pyrethrum djilgense (Franch.) Tzvelev



Phytogeographical element: I-T Habitat: River beds, rocks, screes Elevational range: 2500 - 4800 Flowering period: VI - VII

Remarks: Cryptophyte; plant up to 15(–30) cm high, glabrous; leaves inconspicuously gland-dotted, pinnatifid, with very short ulimate segments; capitula usually solitary, 1.5–3 cm in diameter; ray florets 7–15 mm long;

achene with 6-8 ribs.





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366. Russowia sogdiana (Bunge) B. Fedtsch.



Phytogeographical element: I-T Habitat: River beds, steppes Elevational range: 600 - 2000 Flowering period: IV - V

Remarks: Therophyte; plant 15-50 cm high; middle and upper stem leaves pinnatisect, lobes margin revolute; capitula 0.6-0.8 mm in diameter; phyllaries with membranous margin, outer and middle - ovate to elliptic, inner – lanceolate; achene yellowish brown.

367. Saussurea elegans Ledeb.



Phytogeographical element: I-T, E-S

Habitat: Juniper forests, screes, xeric shrubs, forbs

Elevational range: 2000 - 2300 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 20-70 cm high; stem strawcolored to purplish red; lower and middle stem leaves adaxially glabrous; capitula numerous, 1–1.6 in diameter; involucre narrowly campanulate; phyllaries greenish but purple apically; achene pale brown.

368. Saussurea famintziniana Krassn.



Phytogeographical element: I-T

Habitat: Fens and mires, alpine semi-deserts, salt marshes

Elevational range: 3500 - 4200

Flowering period: VII

Remarks: Cryptophyte; plant 2–12 cm high; rootstock stout, with fibrously split bark; rosette and lower stem leaves scabrid, margin coarsely dentate; synflorescence composed of 3-4 capitula; capitula 0.8-1.5 cm in diameter; phyllaries purplish, unequal.

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369. Saussurea glacialis Herder



Phytogeographical element: I-T, E-S Habitat: Moraines and snow-beds Elevational range: 3800 - 4900 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 2–6 cm high; caudex covered with remains of petioles; leaves oblong or spatulate; synflorescence composed of 10–20 capitula; capitula 0.7–1 cm in diameter; phyllaries equal, apically purple or blackish. Usefulness: Orn.

370. Saussurea kabadiana Rassulova& B.A. Sharipova



Phytogeographical element: E, I-T Habitat: River beds, salt shrubs Elevational range: 350 - 500 Flowering period: IX - X

Remarks: Cryptophyte; plant 50–110 cm high; basal leaves lyrate, both surfaces gland-dotted; capitula numerous, 0.6–2 cm in diameter; phyllaries green, with eglandular and glandular hairs; corolla glandular; outer hairs of pappus persistent.

371. Saussurea leucophylla Schrenk



Phytogeographical element: EI-T Habitat: Screes, alpine steppes Elevational range: 3700 - 4500

Flowering period: VIII

Remarks: Cryptophyte; plant 2.5–10 cm high; caudex branched, with many sterile leaf rosettes and flowering stems; leaves linnear, margin entire; capitula solitary, 1.8–1.9 in diameter; phyllaries green, equal, covered with wooly hairs.

vooly nairs.













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372. Saussurea ovata Benth.



Phytogeographical element: EI-T

Habitat: Alpine semi-deserts, alpine steppes

Elevational range: 3400 - 3400 Flowering period: VIII

Remarks: Cryptophyte; plant up to 25 cm high; stem furrowed; leaves ovate, acute, margin dentate or entire; capitula numerous, 1–1.5 in diameter; phyllaries green, margin purple; corolla glabrous.

373. Saussurea pseudosalsa Lipsch.



Phytogeographical element: EI-T, E-S

Habitat: Alpine meadows, slpine steppes, forbs

Elevational range: 1600 - 3800 Flowering period: VII - IX

Remarks: Cryptophyte; plant 10–60 cm high; leaf blade oblong, elliptic or narrowly ovate, 3.5- 10×0.5 -4 cm, fleshy, both surfaces grayish green and scabrid; capitula in a corymbiform synflorescence; phyllaries apically or entirely dark purple; receptacle bristles subulate; achene cylindric.

374. Saussurea salsa (Pall. ex Pall.) Spreng.



Phytogeographical element: I-T, E-S

Habitat: Alpine steppes Elevational range: 2300 - 4200

Flowering period: VII

Remarks: Cryptophyte; plant 20–80 cm high; stem winged; basal leaves withered at anthesis; leaf margin dentate to denticulate; capitula up to 1.5 cm in diameter, in a corymbiform synflorescence; phyllaries pinkish green; outer hairs of pappus not persistent.

Usefulness: For, Orn.

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375. Saussurea sordida Kar. & Kir.



Phytogeographical element: I-T

Habitat: Alpine semi-deserts, alpine steppes

Elevational range: 2300 - 3700 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 20–100 cm high; stem base covered with fibrous remains of leaf sheaths; leaves broadly lanceolate, dentate; capitula 2–4 cm in diameter, solitary or 2–4 arranged in corymbose synflorescence; involucre spherical; phyllaries blackish-purple, pubescent.

376. Schischkinia albispina (Bunge) Iljin



Phytogeographical element: I-T Habitat: Screes, steppes Elevational range: 800 - 1800

Flowering period: IV

Remarks: Therophyte; plant up to 5 cm high; leaves oblong-spatulate, glandular, margin with white spines; capitula 4–7 mm in diameter; phyllaries glabrous, apex acuminate and tipped with a short spine.

377. Schmalhausenia nidulans (Regel) Petr.



Phytogeographical element: EI-T Habitat: Alpine meadows, alpine swards

Elevational range: 2600 - 3900 Flowering period: VII - IX

Remarks: Cryptophyte; plant up to 25 cm high; leaves densely and fluffily villous; capitula 5–10; phyllaries narrowly lanceolate, apex narrowed into a long subulate spine; outer and middle phyllaries abaxially villous; achene wrinkled, ribs prolonged into a small tooth; pappus bristles brown, up to 1.3 cm.

375





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378. Scorzonera bracteosa C. Winkl.



Phytogeographical element: E, I-T

Habitat: Rocks, loose sandy screes, screes, steppes

Elevational range: 1200 - 1900 Flowering period: V - VII

Remarks: Cryptophyte; plant (20–) 75–105 cm high; middle stem leaves 2.1–5 cm wide, margin undulate; bracts 2–5, broadly lanceolate or ovate-lanceolate; capitula 7–8 cm long (during fruiting), involucre 1.6 cm in

diameter, achene glabrous.

379. Scorzonera circumflexa Krasch.& Lipsch.



Phytogeographical element: I-T

Habitat: River beds, steppes, thermophilous shrubs, forbs

Elevational range: 450 - 3000 Flowering period: III - IV

Remarks: Cryptophyte; plant 10–35 cm high, with a globose tuber some cm below surface; basal leaves 0.8–2.3 cm wide, with 3–7 prominent veins; capitula 1.3–1.7 cm long; involucre 1–1.2 cm in diameter; achene

densely pubescent. Usefulness: Foo.

380. Scorzonera hissarica C. Winkl.



Phytogeographical element: I-T

Habitat: River beds, steppes, thermophilous shrubs, forbs

Elevational range: 800 - 2100 Flowering period: V - VI

Remarks: Cryptophyte; plant 15–25(–70) cm high; stems unbranched; basal leaves lanceolate or ovate-laceolate, 1.2–7 cm wide; capitula 4.5–4.8 cm long (during fruiting); involucre 6–9 mm in diameter; achene glabrous.

381. Scorzonera inconspicua Lipsch.



Phytogeographical element: I-T

Habitat: River beds, rocks, screes, steppes

Elevational range: 900 - 3550 Flowering period: V - VII

Remarks: Cryptophyte; plants 10-35 cm high, slightly hairy, glabrescent; basal and lower stem leaves lanceolate, 1-1.7 cm wide, margin undulate; capitula up to 3.5 cm long (during fruiting), involucre 0.6-1 cm in diameter; achene with tuberculate ribs, glabrous.

382. Scorzonera parviflora Jacq.



Phytogeographical element: I-T

Habitat: Meadows, fens and mires, fields, salt shrubs

Elevational range: 600 - 1700 Flowering period: VI - VIII

Remarks: Cryptophyte, hemicryptophyte; plant 10-60 cm high, glabrous; leaves lanceolate or linear, 2-15 mm wide, succulent; capitula 2.5–3 cm long (during fruiting), involucre 0.5-1 cm in diameter; achene yellowish, with

smooth elevated ribs, glabrous.

383. Scorzonera pubescens DC.



Phytogeographical element: I-T

Habitat: Steppes

Elevational range: 2200 - 3900 Flowering period: VI - VII

Remarks: Cryptophyte; plant (5-) 20-35 cm high, with conspicuous gray indumentum; basal and lower stem leaves linear, 3-5 mm wide, margin flat; capitula 4 cm long (during fruiting); involucre 6-7 mm in diameter; achene with tuberculate ribs; pappus dirty white.













384. Scorzonera subacaulis (Regel) Lipsch.



Phytogeographical element: EI-T Habitat: Alpine meadows, alpine swards

Elevational range: 2800 - 3600 Flowering period: VI - VII

Remarks: Cryptophyte; plant acaulescent or up to 10 cm high; rosette leaves linear, apex acuminate; capitula solitary, 4.5–5 cm long; achene with smooth ribs, glabrous; pappus dirty white, ca. 1.2 cm.

385. Scorzonera tragopogonoides Regel & Schmalh.



Phytogeographical element: I-T

Habitat: River beds, steppes, xeric shrubs, thermophilous

shrubs

Elevational range: 900 - 3900 Flowering period: V - VIII

Remarks: Cryptophyte; plant (10–)25–45(–95) cm high; middle stem leaves linear, linear-lanceolate or lanceolate, 1–8 mm wide; capitula 5.5–7.5 cm long (during fruiting), ebracteate or with poorly developed lanceolate bracts; involucre 1–1.4 cm in diameter, achene glabrous.

386. Senecio erucifolius L.



Phytogeographical element: Plurireg

Habitat: Ruderal

Elevational range: 1000 - 1800 Flowering period: VI - VIII

Remarks: Cryptophyte; plant up to 120 cm high; middle and upper leaves pinatisect with a small, narrow terminal lobe; involucre floccose with 4–6 supplementary phyllaries; achene 2 mm long, shortly hairy; pappus 6 mm long.

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387. Senecio franchetii C. Winkl.



Phytogeographical element: E, I-T Habitat: River beds, steppes, forbs Elevational range: 750 - 3300 Flowering period: IV - VII

Remarks: Cryptophyte; plant 25–80 cm high; basal and lower stem leaves lanceolate or broadly oblong; leaf base cuneate, never pinnatified; synflorescence consisted of 3–12 capitula; capitula 1.5–2 cm in diameter; achene 6–8 mm long, pubescent; pappus 1.5–2 × longer than achene.

388. Senecio thianschanicus Regel & Schmalh.



Phytogeographical element: EI-T, E-S

Habitat: Screes, steppes Elevational range: 2000 - 4500 Flowering period: VI - VIII

Remarks: Cryptophyte; plant up to 20 cm high, sparsely arachnoid; leaves petiolate, adaxially green, obovate or spatulate, $4-8 \times 0.8-1.5$ cm; phyllaries ca. 13, linear-oblong, $6-7 \times 1-1.5$ mm, usually dark colored and often finished on village.

fimbriate, or villous.

389. Senecio jacobea L.



Phytogeographical element: Plurireg

Habitat: Roadsides Elevational range: 1000 - 2400 Flowering period: VI - VII

Remarks: Cryptophyte; plant 50–80 cm high; leaves evenly distributed (basal often withering before flowering); blade of lower stem leaves oblong-obovate in outline; capitula up to 12 mm in diameter, (10–)20–60 in corymbiform synflorescence, outer achene glabrous, inner – pubescent.















390. Senecio olgae Regel & Schmalh.



Phytogeographical element: E, I-T

Habitat: Screes, forbs

Elevational range: 1100 - 3300 Flowering period: IV - VI

Remarks: Cryptophyte; plant 25–100 cm high; basal and lower stem leaves broadly ovate; leaf base truncate or cordate; capitula 1–1.5 cm in diameter; synflorescences composed of 3–7(–9) capitula; achene pubescent; pappus as long as achene or slightly longer.

391. Senecio paulsenii O. Hoffm.



Phytogeographical element: E, I-T

Habitat: Screes, alpine steppes, moraines and snow-beds,

forbs

Elevational range: 2300 - 4000 Flowering period: VI - VII

Remarks: Cryptophyte; plant 15–50 cm high; basal and lower stem leaves oblong or lanceolate; leaf base cuneate; capitula 2–3 cm in diameter, solitary or synflorescence consisted of 2–4 capitula; achene glabrous.

392. Senecio renardii C. Winkl.



Phytogeographical element: I-T Habitat: Rocks, screes, forbs Elevational range: 1100 - 3500 Flowering period: VI - VII

Remarks: Cryptophyte; plant perennial, (20–)30–60(–70) cm high; basal and lower stem leaves obovate to obovate-oblong, sometimes leaf base pinnatified; synflorescence composed of 9–30 capitula; capitula

1-1.5 cm in diameter; achene glabrous.

393. Senecio saposhnikovii Krasch. & Schipcz.



Phytogeographical element: EI-T

Habitat: Screes

Elevational range: 2000 - 2500 Flowering period: VI - VIII

Remarks: Cryptophyte; plant up to 60 cm high; stems ribbed; leaves lanceolate, dentate, sometimes pinnatisect; phyllaries ovate; achene ca. 2 mm long; pappus white, 6–7

mm long.

394. Senecio subdentatus (Bunge) Ledeb.



Phytogeographical element: I-T, E-S

Habitat: Juniper forests, screes, steppes, xeric shrubs, forbs

Elevational range: 350 - 2700 Flowering period: III - V

Remarks: Therophyte; plant 5–30 cm high; lower leaves pinnatifid, with linnear lobes; capitula 3–8 mm in dameter; ray florets 10–12, 1.5–2 × longer than involucre;

achenes pubescent.

395. Seriphidium skorniakovii (C. Winkl.) K. Bremer & Humphries ex K. Bremer & Humphries

Synonyms: Artemisia skorniakowii C. Winkl.



Phytogeographical element: EI-T

Habitat: Alpine semi-deserts, alpine steppes

Elevational range: 3500 - 4300

Flowering period: IX

Remarks: Chamaephyte; plant 20–30 cm high, grayish, with a few fertile and numerous sterile shoots; blade of lower stem leaves round-ovoid in outline; capitula up to 5

mm long; achene oblong-ovate, ribbed.

Usefulness: For.

















396. Serratula algida Iljin



Phytogeographical element: I-T

Habitat: Alpine meadows, steppes, forbs

Elevational range: 2600 - 3800 Flowering period: VI - VIII

Remarks: Cryptophyte; plant (15–)25–30(–80) cm high; stem solitary, erect; leaves glabrous or hairs scattered on the leaf blade, margin ciliate; capitula solitary, 2.5–5 cm in diameter; achene 5–6 mm long; pappus 9–10 mm long.

397. Serratula lyratifolia Schrenk



Phytogeographical element: I-T

Habitat: Screes

Elevational range: 2000 - 3000 Flowering period: VI - VII

Remarks: Cryptophyte; plant almost stemless, or stem 2–8 cm high; caudex covered with residues of old leaf bases; leaf blade lyrate, capitula 2–3(–4) cm in diameter; achene smooth, 5–6 mm long; pappus 1.7–2 cm long.

398. Serratula procumbens Regel



Phytogeographical element: I-T Habitat: Screes, alpine semi-deserts Elevational range: 2500 - 4300 Flowering period: VI - VII

Remarks: Cryptophyte; plant 5–20 cm high; caudex covered with residues of old leaf bases; stem procumbent; leaves leathery; capitula 2–3 cm in diameter; achene 4–5

mm long, pappus 1.1–1.2 cm long.

399. Serratula sogdiana Bunge



Phytogeographical element: I-T

Habitat: River beds, juniper forests, xeric shrubs

Elevational range: 2300 - 2600 Flowering period: VI - VII

Remarks: Cryptophyte; plant 25–55 cm high; caudex covered with residues of old leaf bases; leaves +/- leathery, oblong, without reticulate venation; capitula 2–3 cm in diameter; outer and middle phyllaries yellowish-green, without dark tips; achene 4–5 mm long; pappus 1–1.1 cm long.

400. Silybum marianum (L.) Gaertn.



Phytogeographical element: I-T, M, E-S

Habitat: Roadsides, fallows, arable fields, steppes, river

valleys

Elevational range: 800 - 2300 Flowering period: IV - VI

Remarks: Therophyte, hemicryptophyte; plant 20–70 cm high; stem glabrous at base; stem leaves broadly eliptical or ovate, serrate; peduncle hairy; capitula 1–1.5 cm in diameter, achene 4–5 mm long; pappus white, 5–6 mm long.

401. Solidago kuhistanica Juz.



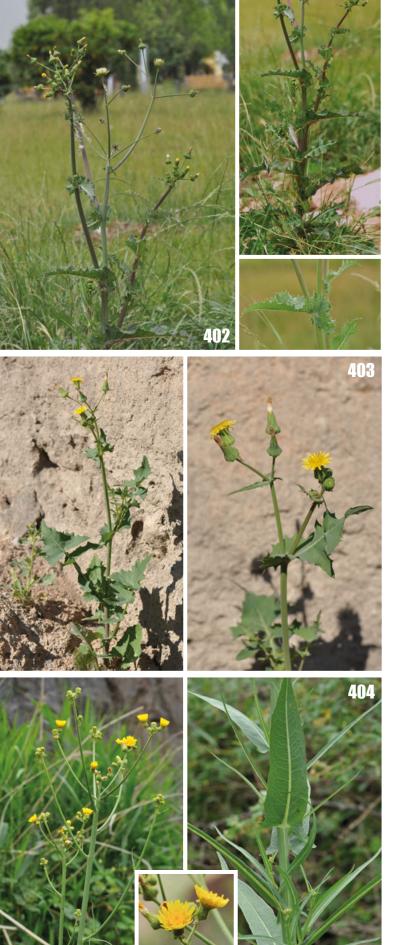
Phytogeographical element: SE, I-T Habitat: Meadows, forbs, springs Elevational range: 1100 - 3200 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 50–100 cm high; blade of stem leaves oblong to lanceolate, base auriculate, margin usually pinnately lobed, terminal lobe usually larger than lateral; capitula 2–4 cm in diameter; peduncle and phyllaries glandular; achene flat with 5 ribs on each side.









402. Sonchus asper L.



Phytogeographical element: A, Plurireg

Habitat: Ruderal, fields Elevational range: 600 - 2200 Flowering period: IV - VI

Remarks: Therophyte, hemicryptophyte; plant 40–150 cm high; middle and upper stem leaves adaxially dull green, base auriculately clasping, terminal lobe broadly triangular, broadly hastate or obovate-cordate; capitula 1–1.5(–2.5) cm in diameter; phyllaries glabrous or with few glandular hairs; achene distinctly compressed, without wings.

403. Sonchus oleraceus (L.) L.



Phytogeographical element: Plurireg Habitat: River beds, ruderal, fields Elevational range: 400 - 2700 Flowering period: V - VIII

Remarks: Therophyte, hemicryptophyte; plant up to 180 cm high; upper part of stem glandular; middle and upper stem leaves lanceolate; uppermost stem leaves reduced, linear-lanceolate to linear; capitula 1–2.5(–3) cm in diameter; phyllaries abaxially glandular hairy; achene +/-quadrangular in cross section.

404. Sonchus palustris L.



Phytogeographical element: Plurireg Habitat: Fens and mires, littoral vegetation

Elevational range: 1200 - 2000 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 25–50(–80) cm high, rhizomatous; stem base glabrous; leaves lanceolate or linear in outline; capitula 0.8–1.5 cm in diameter; achene yellowish, compressed, winged, with 3 ribs on each side.

Usefulness: Med, Foo.

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405. Sonchus transcaspicus Nevski



Phytogeographical element: I-T

Habitat: Fens and mires, littoral vegetation, springs

Elevational range: 400 - 3000 Flowering period: V - X

Remarks: Cryptophyte; plant 40–150 cm high; leaves lanceolate or oblong-lanceolate, up to 40 cm long, up 10 cm wide; capitula 4–7(–9) cm in diameter; pappus

persistent.

406. Stemmacantha integrifolia (C. Winkl.) Dittrich

Synonyms: Rhaponticum integrifolium C. Winkl.



Phytogeographical element: A, I-T

Habitat: Screes, ruderal, steppes, xeric shrubs, forbs

Elevational range: 1100 - 2600 Flowering period: V - VI

Remarks: Cryptophyte; plant 25–50 cm high; leaves oblong-lanceolate or lyrate, up to 30 cm long, up to 4 cm wide; capitula 4.5–6 cm in diameter; pappus not persistent.

persistent.

407. Stemmacantha lyrata (Iljin) Dittrich

Synonyms: Rhaponticum lyratum C. Winkl. ex Iljin



Phytogeographical element: I-T

Habitat: Broad-leaved forests, xeric shrubs, forbs

Elevational range: 2200 - 2800 Flowering period: VI - VII

Remarks: Cryptophyte; plant (25–)60–120 cm high; stem branched in upper part; leaves oblong-lanceolate; middle and upper stem leaves sessile, entire; capitula 1.5–2.3 cm in diameter; involucre broadly ovate; phyllaries apex with 3 mm long spine, margin with 5–9 spines.

















408. Stizolophus balsamita (Lam.) K. Koch



Phytogeographical element: I-T, M

Habitat: Steppes

Elevational range: 800 - 2000 Flowering period: V - VI

Remarks: Therophyte; plant 70–10 cm high; stem evenly leafy; leaves oblong-lanceolate; capitula nemerous, up to 2.5 cm in diameter; ray florets 1–1.2 cm long; pappus 4–5 mm long.

409. Symphyotrichum graminifolium (Spreng.) G.L. Nesom

Synonyms: Conyzanthus graminifolius (Spreng.) Tamamsch.



Phytogeographical element: A, Plurireg

Habitat: Ruderal

Elevational range: 400 - 500 Flowering period: VIII - IX

Remarks: Therophyte, hemicryptophyte; plant 10–30 cm high, with a globose tuber below surface; leaves 1–3 mm wide, margin revolute; capitula 2–4.5 cm long (during fruiting); involucre 5–6 mm in diameter; achene whitish or light yellow; pappus dirty white or yellow.

410. Symphyotrichum salignum (Willd.) G.L. Nesom

Synonyms: Aster salignus Willd.



Phytogeographical element: A, Plurireg

Habitat: Ruderal

Elevational range: 650 - 2100 Flowering period: IX - X

Remarks: Cryptophyte; plant 50–70 cm high; stem glabrous, purplish at base; middle stem leaves linear, lanceolate, distantly serrulate; capitula 5–8 mm in diameter; ray florets 3.5–4.2 mm long; ache pubescent;

pappus 4–4.5 mm long.

411. Takhtajaniantha pusilla (Pall.) Nazarova

Synonyms: Scorzonera pusilla Pall.



Phytogeographical element: I-T, E-S

Habitat: Rocks, screes, steppes, alpine steppes

Elevational range: 400 - 4300 Flowering period: IV - VIII

Remarks: Cryptophyte; plant 40–70 cmm high, green, usually hairy; upper part of stem poorly branched; petiole basally densely pubescent; peduncle up to 15 cm long; capitula 5–8 mm in diameter, solitary; achene with crown up to 1 mm long, composed of 5 unequal teeth.

Usefulness: For.

412. Tanacetopsis czukavinae Kovalevsk. & Junussov



Phytogeographical element: E, I-T

Habitat: Rocks, screes, steppes, xeric shrubs

Elevational range: 2400 - 3200 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 25–70 cm high, covered with simple, lobed and glandular hairs; peduncle up to 8 cm long, synflorescence composed of 2–8 capitula; achene

with crown composed of 5-7 unequal lobes.

413. Tanacetopsis mucronata (Regel & Schmalh.) Kovalevsk.



Phytogeographical element: SE, I-T Habitat: Rocks, loose sandy screes, screes

Elevational range: 1700 - 3700 Flowering period: VII - IX

Remarks: Cryptophyte; plant 35–65 cm high, grayish; upper part of stem richly branched; synflorescence composed of 3–17 capitula; peduncle 1–7 cm long; capitula 7–10 mm in diameter; achene with crown 0.4–0.5 mm long, composed of 5 unequal lobes.













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414. Tanacetopsis pamiralaica (Kovalevsk.) Kovalevsk.



Phytogeographical element: E, I-T Habitat: Rocks, screes, steppes Elevational range: 1200 - 2500 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 10–30 cm high, grayish, villous; peduncle up to 10 cm long; capitula 7–15 cm in diameter, solitary; achene with crown 0.4–0.5 mm long,

composed of few unequal lobes.

415. Tanacetopsis santoana (Krasch., Popov & Vved.) Kovalevsk.



Phytogeographical element: E, I-T Habitat: River beds, rocks, screes, steppes

Elevational range: 350 - 800 Flowering period: V - VI

Remarks: Cryptophyte; plant 40–60 cm high, glabrous or simple and glandular hairs scattered on the stem; peduncle up to 10 cm long; capitula 6–10 mm in diameter, soiltary or synflorescence composed of 2–10 capitula; achene with crown 0.6–1 mm long, composed of 5 equal

416. Tanacetopsis submarginata (Kovalevsk.) Kovalevsk.



Phytogeographical element: E, I-T

Habitat: Rocks

Elevational range: 1700 - 1750 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 25–65 cm, grayish, densely pubescent; peduncle 0.6–10 cm long; synflorescence composed of 4–15 capitula; capitula 6–12 mm in diameter;

achene with crown 0.5–1 mm long.

417. Tanacetum griffithii (C.B. Clarke) Muradyan

Synonyms: Spathipappus griffithii (Clarke) Tzvel.



Phytogeographical element: I-T

Habitat: River beds, rocks, screes, moraines and snow-beds

Elevational range: 3000 - 3800 Flowering period: VI - VII

Remarks: Chamaephyte; plant 15-45 cm high; leaves hairy, with glandular trichomes; middle and upper leaves sessile; capitula 2.5–3 cm in diameter; phyllaries hairy, margin membranous, dark; achene 3-3.5 mm, pappus consist of scales.

418. Tanacetum transiliense Herder

Synonyms: Pyrethrum transiliense (Herder) Regel & Schmalh.



Phytogeographical element: I-T

Habitat: Rocks, screes, moraines and snow-beds

Elevational range: 2000 - 3300

Flowering period: VI

Remarks: Cryptophyte; plant 10–35 cm high; leaves green or greyish-green, slightly hairy, with glands; capitula 1.5-3 cm in diameter; phyllaries with black-brown margin; achene with 6-8 ribs; papus dissected irregularly into linear lobes.

419. Taraxacum badachschanicum Schischk.



Phytogeographical element: E, I-T Habitat: Alpine meadows, fens and mires

Elevational range: 2700 - 3600 Flowering period: VII - IX

Remarks: Cryptophyte; plant 8-15 cm high; leaves 4–12 cm long; capitula 2–2.5 cm in diameter; phyllaries light green, often pinkish, margin ciliate; achene (with

cone) 4.5-5.5 mm long; beak 7-8 mm long.



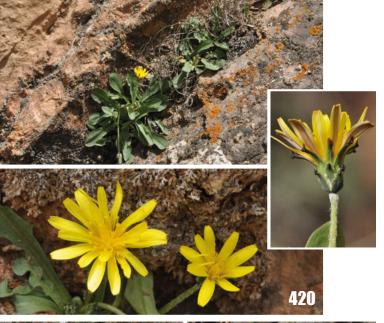


















420. Taraxacum erostre Zakirov



Phytogeographical element: E, I-T

Habitat: Rocks, screes, nitrophilous rock footings,

moraines and snow-beds Elevational range: 2000 - 3300 Flowering period: VII - VIII

Remarks: Cryptophyte; plant up to 10 cm high; leaves 3–8 cm long; petiole basally villous; leaf blade lyrate, broadly lanceolate or pinnatisect; capitula 2–2.5 cm in diameter; achene 5–6 mm long; cone 0.5 mm long; beak 1–2 mm long.

421. Taraxacum leucanthum (Ledeb.) Ledeb.



Phytogeographical element: I-T

Habitat: Alpine meadows, fens and mires, pastures, salt

marshes

Elevational range: 3200 - 4000 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 3–10 cm high; leaves linear, 2–8(–10) cm long; capitula 1.5–2 cm in diameter; styles black; achene 3–3.5 mm long; rostrum 0.6–1 mm long.

422. Taraxacum lilacinum Krasn. ex Schischk.



Phytogeographical element: I-T

Habitat: Alpine meadows, fens and mires

Elevational range: 3600 - 3700 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 4–12 cm high; stem brownish green, glabrous, during flowering 1.5 × longer than leaves; petiole green to pinkish, unwinged; capitula 2–2.5 cm in diameter; outer phyllaries dark green; achene

3.5–4 mm long; beak of achene 3–4 mm long.

423. Taraxacum murgabicum Vainberg



Phytogeographical element: E, I-T

Habitat: Alpine meadows, fens and mires, pastures, salt

marshes

Elevational range: 3200 - 4000 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 5–10 cm high; leaves 3–10 cm long; capitula 1–1.5(–2) cm in diameter; stigmas dirty yellow; achene 3.5–4.5 mm long; cone 0.2–0.5 mm

long; beak 1–2 mm long.

424. Tragopogon alaicus S.A. Nikitin



Phytogeographical element: E, I-T

Habitat: Alpine steppes Elevational range: 2000 - 2500 Flowering period: VI - VII

Remarks: Cryptophyte; plant 30–60 cm high, glabrous; basal leaves flat; stem leaves 6–10 mm wide; peduncle not swollen below capitula; capitula 1.8–2 cm in diameter, 4.5–5 cm long; pappus longer than achene with beak.

425. Tragopogon conduplicatus S.A. Nikitin

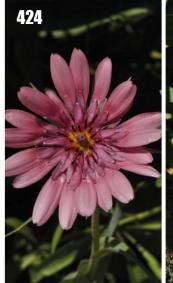


Phytogeographical element: I-T Habitat: Screes, steppes Elevational range: 1600 - 3000 Flowering period: VI - VII

Remarks: Cryptophyte; plant 7–17 cm high; basal leaves linnear, folded, 2–3 mm wide; peduncles not swollen below capitula; capitula 1.5–1.7 cm in diameter, 2–3(–4) cm long (during fruiting); pappus as long as

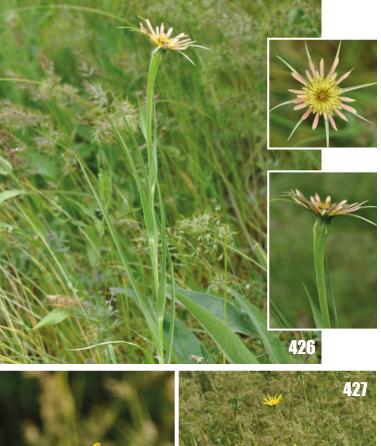
achene or slightly longer.



















426. Tragopogon porrifolius L. subsp. longirostris (Sch. Bip.) Greuter

Synonyms: Tragopogon krascheninnikovii S.A. Nikitin



Phytogeographical element: I-T

Habitat: Broad-leaved forests, steppes, xeric shrubs, forbs

Elevational range: 900 - 1700 Flowering period: IV - V

Remarks: hemicryptophyte; plant 30–80(–120) cm high; basal leaves up to 4 mm wide; peduncles swollen below capitula; capitula 2–3 cm in diameter, 6–8 cm long (during fruiting); phyllaries 2 longer than florets; beak of achene curved; pappus shorter than achene with beak.

427. Tragopogon serawschanicus S.A. Nikitin



Phytogeographical element: E, I-T

Habitat: Steppes

Elevational range: 1300 - 2800

Flowering period: VII

Remarks: Cryptophyte, hemicryptophyte; plant 35–50 cm high; stem leaves 1.8–2 cm wide; peduncles slightly swollen below capitula; capitula 2–2.5 cm in diameter, 5–7(–8) cm long (during fruiting); pappus shorther than achene with beak.

428. Tragopogon turkestanicus S.A. Nikitin ex Pavlov



Phytogeographical element: I-T

Habitat: Loose sandy screes, screes, fields, forbs

Elevational range: 2800 - 4000 Flowering period: V - VI

Remarks: hemicryptophyte; plant 35–70(–100) cm high; stem branched in upper part; stem leaves 3–10 mm wide; capitula 1.5–3 cm in diameter, 3–4(–5) long (during fruiting); pappus shorther than achene with beak.

429. Tragopogon vvedenskyi Popov ex Popov



Phytogeographical element: I-T Habitat: Steppes, screes Elevational range: 800 - 3200 Flowering period: V - VI

Remarks: hemicryptophyte; plant 20–50(–60) cm high; stem leaves 1–1.5 cm wide; peduncles not swollen below capitula; capitula 1–1.5 cm in diameter, 3–4.5 long (during fruiting); phyllaries 5; pappus as long as, or longer than achene with beak.

430. Tripleurospermum disciforme (C.A. Mey.) Sch. Bip.



Phytogeographical element: I-T, E-S

Habitat: River beds, meadows, pastures, fields

Elevational range: 1500 - 2800 Flowering period: VI - VIII

Remarks: Therophyte, hemicryptophyte; plant 40–75 cm high; capitula 8–12 mm in diameter; phyllaries with dark brown, scarious margin; ligule of ray florets very short (shorther than corolla of tubular florets); achene smooth.

431. Tussilago farfara L.



Phytogeographical element: Plurireg Habitat: River beds, ruderal, forbs Elevational range: 1000 - 3500 Flowering period: III - V

Remarks: Cryptophyte; plant 5–10 cm high; fruiting stem with scale-shaped, purplish, bracteate leaves; basal leaves appearing after anthesis, long petiolate; leaf blade orbicular-cordate, abaxially densely white tomentose; capitula 2–3 cm in diameter; achenes cylindric.

Usefulness: Med.



















432. Uechtritzia kokanica (Regel & Schmalh.) Pobed.



Phytogeographical element: I-T

Habitat: Rocks, screes

Elevational range: 1400 - 3200 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 20–80 cm high; all leaves arranged in rosette, abaxially white tomentose; capitula 4–5 cm in diameter; phyllarnies with brown or black apex; achene covered with bristly hairs; pappus 2 cm long.

433. Waldheimia glabra (Decne.) Regel



Phytogeographical element: I-T

Habitat: Rocks, moraines and snow-beds

Elevational range: 3000 - 5000 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 3–5 cm high; leaves glabrous or slightly adaxially pubescent, up to 2 cm long; capitula 1.5–2.5 cm in diameter; phyllaries pubescent at base; ray

florets sterile without pappus.

434. Waldheimia stoliczkae (C.B. Clarke) Ostenf.



Phytogeographical element: I-T

Habitat: Rocks, moraines and snow-beds

Elevational range: 3000 - 4500 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 5–10 cm high; leaves glabrous, 4.5–5 cm long; capitula 3–3.8 cm in diameter; phyllaries usually glabrous, sometimes pubescent at base; ray florets fertile; all achene with well developed pappus.

435. Xanthium orientale L. subsp. italicum (Moretti) Greuter

Synonyms: Xanthium italicum Moretti



Phytogeographical element: A, Plurireg Habitat: River beds, ruderal, forbs Elevational range: 600 - 1200 Flowering period: VI - VIII

Remarks: Therophyte; plant 50–150 cm high; nodal spines absent; leaf blades suborbicular to pentagonal; hooked

projections of bur densely pubescent.

436. Xanthium spinosum L.



Phytogeographical element: Plurireg Habitat: River beds, ruderal, forbs Elevational range: 350 - 600 Flowering period: VI - VIII

Remarks: Therophyte; plant 20–80 cm high; leaf blades blades ovate to lanceolate or lance-linearlanceolate to lanceolate–linear, often pinnately 3(–7)-lobed, abaxially gray to white, nodal spines (1–)3-lobed, 15–30 mm long.

437. Xeranthemum longepapposum Fisch. & C.A. Mey.



Phytogeographical element: I-T

Habitat: River beds, screes, ruderal, fields

Elevational range: 1000 - 1600

Flowering period: V - VI

Remarks: Therophyte; plant 10–50 cm high, greyish; leaves subsessile, 2–5 mm wide, linear or linear-lanceolate; capitula 1.5–2.2 cm long; phyllaries smooth, transparent, whitish; pappus consisted of rough, lanceolate scales.

Usefulness: Orn.













438. Xylanthemum pamiricum (O. Hoffm.) Tzvelev



Phytogeographical element: I-T Habitat: Screes, steppes, semideserts Elevational range: 3000 - 4300 Flowering period: VII - IX

Remarks: Cryptophyte; plant 5–20 cm high; leaf blades up to 2 cm long, pinnately lobed, with 2–6 lateral lobes; capitula 5–8 mm in diameter; achene with crown

composed of 3-6 oblong lobes.

439. Zoegea baldschuanica C. Winkl.



Phytogeographical element: I-T

Habitat: Screes, steppes, thermophilous shrubs

Elevational range: 600 - 2300 Flowering period: IV - V

Remarks: Therophyte; plant 15–60 (–80) cm high; basal and lower stem leaves pinnatifid; upper stem narrowly leaves lanceolate; capitula 1–1.5 cm in diameter; deltoid appendages of outer and middle phyllaries with very long, reddish, reflexed fringes; pappus 2 × longer than the achene.

440. Impatiens parviflora DC.



Phytogeographical element: I-T, E-S, M Habitat: Broad-leaved forests, screes, forbs

Elevational range: 600 - 2600 Flowering period: V - VII

Remarks: Therophyte; plants 30–60 cm tall, glabrous or sparsely glandular hairy; leaves alternate; petiole 1.5–2 cm; leaf blade pale green abaxially, dark green adaxially; flowers pale yellow, throat often reddish spotted, small,

ca. 1 cm deep. Usefulness: Foo, Hou.

441. Berberis heterobotrys E.L. Wolf



Phytogeographical element: SE, I-T

Habitat: Juniper forests, broad-leaved forests

Elevational range: 1000 - 2200

Flowering period: VI

Remarks: Nanophanerophyte; shrub up to 3–3.5 m high; spines rigid, simple or 3-fid, pale purplish red, subterete, shorter than leaves, 10–13 mm; inflorescence umbellate raceme, 9–40-flowered; berry black, subglobose, 5–7 × 2–3 mm, slightly pruinose, seeds 3–5.

Usefulness: Foo, Orn.

442. Berberis integerrima Bunge



Phytogeographical element: I-T Habitat: Juniper forests, xeric shrubs Elevational range: 1500 - 3200

Flowering period: VI

Remarks: Nanophanerophyte; shrub up to 2.5–3 m high; spines rigid, simple or 3-fid, purplish red, shorter than leaves, 15–20 mm; inflorescence raceme, 10–30-flowered; berry black, subglobose, 8–10 4–7 mm, seeds 2 (rarely 1 or 3). Usefulness: Ind, Orn.

443. Berberis nummularia Bunge



Phytogeographical element: I-T Habitat: River beds, riverside forests Elevational range: 1500 - 2500

Flowering period: VI

Remarks: Nanophanerophyte; Fruits sphaerical, red; leaves on fruitng sprouts entire; flower bracts shorter than

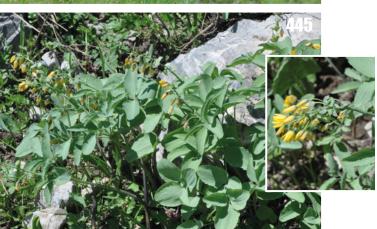
pedicel 3 to 4 times. Usefulness: Ind, Orn.













444. Bongardia chrysogonum (L.) Spach



Phytogeographical element: I-T Habitat: Meadows, steppes, forbs Elevational range: 800 - 2400 Flowering period: III - IV

Remarks: Cryptophyte; plant with scapes 30–50 cm high, erect; tuberous rhizome 2–5 cm in diameter; radical leaves 1–3, imparipinnate 10–20 cm long, horizontally spreading; flowers 10–20 mm across, yellow capsule 10–15 × 4–8 mm, ovoid, scarious or membranous grooved.

Usefulness: Med, Foo.

445. Gymnospermium albertii (Regel) Takht.



Phytogeographical element: SE, I-T

Habitat: Screes, moraines and snow-beds, forbs

Elevational range: 600 - 3000 Flowering period: III - VI

Remarks: Cryptophyte; plant 10–25 cm high, grey green; tuber subglobose, 1–2.5 cm across; stem erect, glabrous; cauline leaf 1, terminal, trifoliolate, thin in texture, petiole 1.5–4 cm; raceme terminal, simple, 5–7-flowered, 4–5 cm; capsule ovoid, 0.8–1 cm in diameter.

446. Leontice ewersmanni Bunge



Phytogeographical element: I-T

Habitat: Steppes, thermophilous shrubs

Elevational range: 400 - 1900 Flowering period: III - IV

Remarks: Cryptophyte; plant 30–50 cm high, glabrous; radical leaves 1 or 2, stem leaves 3–5 biternatiscect, fleshy, glabrous, somewhat glaucous, 5–15 cm long; racemes terminal, 5–10 cm long; flowers 5–6 mm in diameter; capsule 10–15 mm in diameter.

Usefulness: Med, Hou.

447. Betula procurva Litv.

Synonyms: Betula procurva Litv. subsp. sogdiana Ovcz.



Phytogeographical element: E, I-T Habitat: Riverside forests Elevational range: 2100 - 2600 Flowering period: V - VI

Remarks: megaphanerophyte; Tree 5–6 m high; leaves lethery 3–4 long \times 3 cm wide, pubescent with 4–5 pairs of veins; inflorescences at least 1.8–2 cm, side scale lobes bended to the base.

Usefulness: Hou.

448. Betula seravschanica V.N. Vassil.



Phytogeographical element: E, I-T Habitat: Riverside forests Elevational range: 1800 - 2800 Flowering period: V - VI

Remarks: megaphanerophyte; Tree up to 10 m high; inflorescences at least 2–2.5 cm; scales 5–6(–7) mm long, pubescent, side lobes ascendant, leaves 3.5–6 long and

2–4 cm wide. Usefulness: Hou.

449. Biebersteinia multifida DC.



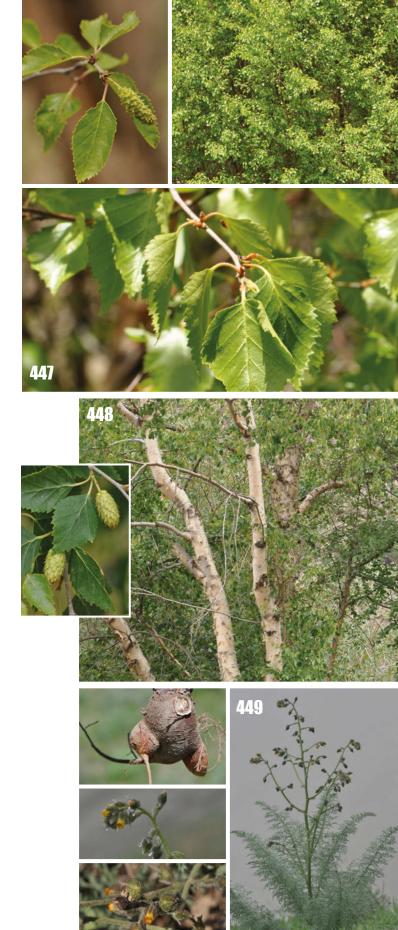
Phytogeographical element: I-T

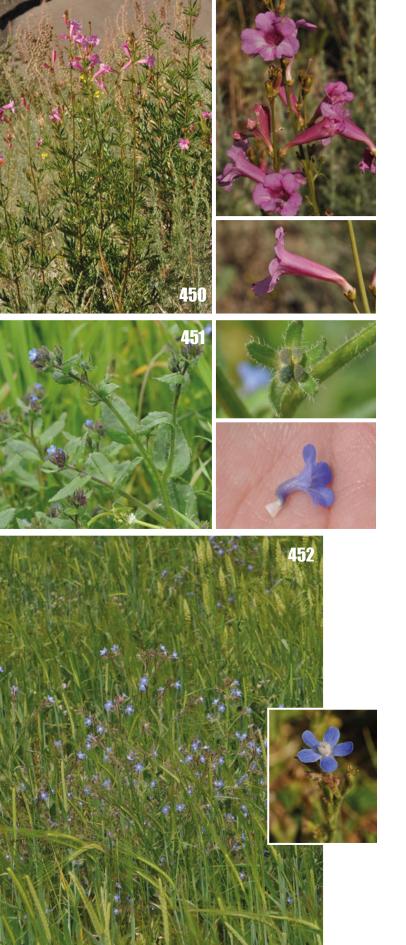
Habitat: Salt shrubs, steppes, xeric shrubs, forbs

Elevational range: 500 - 2300 Flowering period: III - V

Remarks: Cryptophyte; plant up to 50 cm high; stem densely pubescent; leaf blade 3-pinnatisect with linear segments; sepals obovate, 5–7.5 mm long, on fruit up to 13 mm long, apex obtuse, covered with glandular hairs; petals orange yellow, apex dentate-crenate.

Usefulness: Med.





450. Incarvillea olgae Regel



Phytogeographical element: EI-T

Habitat: River beds, riverside forests, screes

Elevational range: 700 - 2800 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 80-150 cm high; capsule

linear.

451. Anchusa arvensis (L.) M. Bieb. subsp. orientalis (L.) Nordh.

Synonyms: Lycopsis orientalis L.



Phytogeographical element: I-T, M

Habitat: Fields

Elevational range: 800 - 2900

Flowering period: IV - V

Remarks: Therophyte; plant 20–40 cm high; corolla blue; tube geniculate curved; nutlets $3-4 \times 2-3$ mm, flattened.

452. Anchusa azurea Mill.

Synonyms: Anchusa italica Retz.



Phytogeographical element: I-T, M, I-I

Habitat: River beds, fields Elevational range: 400 - 2400 Flowering period: IV - VI

Remarks: Cryptophyte; plant 40–100 cm high; calyx 7–10 mm long; corolla 10–15 mm long, straight; anthers the same level as the hairs, 2.5–3 mm long, narrow ovate,

attached ca. 7 mm from tube base.

453. Arnebia cana (Tzvelev) Czerep.

Synonyms: Macrotomia cana Tzvelev



Phytogeographical element: E, I-T

Habitat: Rocks, screes, alpine semi-deserts, steppes

Elevational range: 3600 - 4400 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 5–20 cm high, greyish; stem leaves 2–3 cm long, 2–4 mm wide; plant generously covered with straight hair and long bristles.

454. Arnebia coerulea Schipcz



Phytogeographical element: I-T

Habitat: Loose sandy screes, steppes, thermophilous

shrubs

Elevational range: 350 - 3700 Flowering period: III - VII

Remarks: Therophyte; plant 15–50 cm high; corolla limb

1.2-2 cm in diameter.

455. Arnebia decumbens (Vent.) Coss. & Kralik



Phytogeographical element: I-T, S-S

Habitat: Semi-deserts, steppes, thermophilous shrubs

Elevational range: 350 - 1400 Flowering period: III - IV

Remarks: Therophyte; plant 10-25 cm high; corolla limb

0.2-0.3 cm in diameter, pale yellow.











456. Arnebia euchroma (Royle) I.M. Johnst.

Synonyms: Macrotomia euchroma (Royle) Pauls.



Phytogeographical element: I-T

Habitat: Rocks, screes, alpine semi-deserts, steppes

Elevational range: 2800 - 4400 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 10–35 cm high, green; stem leaves 2-5.5 cm long, 3-9 cm wide; covered with set straight and glandular hair with admixture of bristles.

457. Arnebia guttata Bunge



Phytogeographical element: I-T, E-S

Habitat: Juniper forests, steppes, alpine steppes

Elevational range: 1100 - 3800

Flowering period: IV - VI

Remarks: Cryptophyte, hemicryptophyte; plant 10-25 cm high; stems both spreading long hispid and short strigose; stem leaves spatulate-linear, 1.5-5.5 cm; inflorescences

crowded.

458. Arnebia obovata Bunge



Phytogeographical element: SE, I-T Habitat: Semi-deserts, fields, steppes Elevational range: 450 - 4000

Flowering period: V - VIII

Remarks: Cryptophyte; plant 10–20 cm high; leaves spatulate-oblong, rarely obovate; corolla light violet.

459. Arnebia tibetana Kurz



Phytogeographical element: I-T

Habitat: River beds, loose sandy screes, screes, alpine

steppes

Elevational range: 1400 - 4000 Flowering period: VI - VII

Remarks: Cryptophyte; plant 10-25 cm high; leaves linear-

lanceolate, corolla yellow.

460. Arnebia transcaspica Popov



Phytogeographical element: I-T

Habitat: Loose sandy screes, steppes, thermophilous

shrubs

Elevational range: 400 - 2100 Flowering period: III - V

Remarks: Therophyte; plant 7–20(–25) cm high; limb of

corolla 0.6–1 cm.

461. Asperugo procumbens L.



Phytogeographical element: Plurireg

Habitat: Meadows, pastures, ruderal, xeric shrubs,

thermophilous shrubs Elevational range: 650 - 3800 Flowering period: III - VI

Remarks: Therophyte; plant 10–80(–100) cm high; stem and branches fistular, striate, scabrid with setose retrorse hairs; leaves shortly petiolate; calyx hairy, ca. 2.5 mm long, nodding in fruit, divided into linear-lanceolate lobes; corolla blue, slightly exceeding calyx length.



















462. Buglossoides arvensis (L.) I. M. Johnst.



Phytogeographical element: Plurireg

Habitat: Broad-leaved forests, meadows, fields, steppes,

xeric shrubs, thermophilous shrubs, forbs

Elevational range: 500 - 3000 Flowering period: III - V

Remarks: Therophyte; plant 5–40 cm high; stamens fixed in lower section of corolla tube; nutlets with small pores.

463. Caccinia dubia Bunge



Phytogeographical element: I-T Habitat: Screes

nabitat: Screes

Elevational range: 900 - 2500 Flowering period: IV - VII

Remarks: Cryptophyte; plant 20–50 cm high; leaves elliptic, obtuse or shortly acute at the apex; corolla 18–20 mm, tube 7–11 mm, lobes 4–8 mm; nutlets 6–7 mm.

464. Caccinia macranthera (Banks & Sol.) Brand



Phytogeographical element: I-T Habitat: Screes, steppes Elevational range: 400 - 1500 Flowering period: III -VI

Remarks: Cryptophyte; plant 20–90 cm high; leaves lanceolate with acute apex; corolla 25–37 mm, tube 1.5–22 mm, lobes 8–14 mm; nutlets 8–14 mm.

465. Echium biebersteinii Lacaita



Phytogeographical element: I-T, M Habitat: Ruderal, fields, steppes Elevational range: 800 - 2400 Flowering period: V - VI

Remarks: hemicryptophyte; plant 35-100 cm high; corolla

1–1.3 cm long, pale white–bluish.

466. Echium vulgare L.



Phytogeographical element: Plurireg Habitat: Loose sandy screes, ruderal, fields

Elevational range: 800 - 2400 Flowering period: VII - VIII

Remarks: hemicryptophyte; plant 30-100 cm high; corolla

1.3–1.8 cm long, blue-violet.

467. Eritrichium pamiricum B. Fedtsch. ex O. Fedtsch.



Phytogeographical element: SE, EI-T

Habitat: River beds, screes Elevational range: 2500 - 4300 Flowering period: V - VIII

Remarks: Cryptophyte; plant 15–35 cm high; leaf blade acuminate to acute at apex, with few hairs abaxially; abaxial surface of nutlets ovate-triangular, attachment scar

slightly below middle adaxially.



















468. Eritrichium pseudolatifolium Popov



Phytogeographical element: SE, EI-T

Habitat: Rocks

Elevational range: 3700 - 4000 Flowering period: VIII

Remarks: Cryptophyte; plant 10-25 cm high; leaf blade

ovate to elliptic, apex obtuse; corolla white.

469. Eritrichium pseudostrictum Popov



Phytogeographical element: E, EI-T

Habitat: Rocks

Elevational range: 3500 - 4200 Flowering period: VI - VIII

Remarks: Cryptophyte; plant (15–)20–30 cm high; leaves

linear, along folded, gray from dense hairs.

470. Eritrichium villosum (Ledeb.) Bunge



Phytogeographical element: Plurireg Habitat: Alpine swards, pastures Elevational range: 2700 - 4100 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 5–17 cm high; lower leaves in

a rosette; nutlet cubar.

471. Gastrocotyle hispida (Forssk.) Bunge

Synonyms: Anchusa hispida Forssk.



Phytogeographical element: I-T, I-I Habitat: Loose sandy screes, screes, fields

Elevational range: 400 - 1700 Flowering period: IV - V

Remarks: Therophyte; plant spreading, 15–50 cm; flowers

blue, fruit with 4 nutles.

472. Heliotropium dasycarpum Ledeb.



Phytogeographical element: I-T Habitat: Deserts, salt marshes Elevational range: 400 - 1000 Flowering period: V - VI

Remarks: Cryptophyte; plant 20-55 cm high; corolla limb

acute, linear; corolla tube glabrous inside.

Usefulness: For.

473. Heliotropium ellipticum Ledeb.



Phytogeographical element: I-T, I-I

Habitat: Ruderal, fields Elevational range: 400 - 1700 Flowering period: V - VII

Remarks: Therophyte; plant 10-40 cm high; throat

glabrous; corolla 3–4.5 mm long.







474. Heliotropium olgae Bunge



Phytogeographical element: SE, I-T

Habitat: Loose sandy screes, ruderal, salt marshes, steppes

Elevational range: 400 - 1100 Flowering period: V - IX

Remarks: Therophyte; plant 10–45 cm high; throat

pubescent; corolla tube 6-10 mm long.

475. Heterocaryum macrocarpum Zakirov



Phytogeographical element: I-T, S-S

Habitat: Meadows, ruderal, fields, steppes

Elevational range: 400 - 2100 Flowering period: IV - VI

Remarks: Therophyte; plant 15–40 cm high; all nutlets unwinged; fruit peduncle 5–7 mm long almost equals fruit

length.

476. Heterocaryum subsessile Vatke



Phytogeographical element: I-T

Habitat: Steppes

Elevational range: 400 - 1300

Flowering period: IV - V

Remarks: Therophyte; plant 10-40 cm high; fruit sessile;

nutlets with two cup-shape rough margin.

477. Heterocaryum szovitsianum (Fisch. & C.A. Mey.) DC.



Phytogeographical element: Plurireg Habitat: River beds, fields, steppes Elevational range: 600 - 1900 Flowering period: IV - VI

Remarks: Therophyte; plant up to 32 cm high; calyx lobes ca. 3.5 mm long, linear, in fruit up to 12 mm long; corolla blue; fruit ovoid, 5–8 mm long; nutlets 4, heteromorphic.

478. Kuschakewiczia turkestanica Regel & Smirn.

Synonyms: Solenanthus turkestanicus (Regel & Smirn.) Kusn.



Phytogeographical element: I-T

Habitat: Juniper forests, steppes, xeric shrubs,

thermophilous shrubs Elevational range: 600 - 2000 Flowering period: III - V

Remarks: Cryptophyte; plant 15–40(–50) cm high; corolla

yellowish; inflorescence head-shaped.

479. Lappula marginata (M. Bieb.) Gürke

Synonyms: Lappula stricta (Ledeb.) Guerke



Phytogeographical element: EI-T

Habitat: River beds, riverside forests, fields

Elevational range: 2800 - 4200 Flowering period: V - VII

Remarks: Therophyte; plant 15–30 cm high; plant branched mainly on upper part of stems; nutlets ca. 3 mm, marginal glochids 1.2–2 mm, disc with protruding keel.















480. Lappula occultata Popov



Phytogeographical element: I-T

Habitat: Rocks, screes, steppes, xeric shrubs

Elevational range: 1200 - 2400 Flowering period: IV - V

Remarks: Therophyte; plant 30–40 cm high; calyx lobes exceeding fruit; pedicel always straight; corolla light blue; tube slightly longer than calyx; nutlets 2.5–3 mm, finely tuberculate, with very short glochids on margin of inconspicuous disc.

481. Lappula spinocarpos (Forssk.) Asch. ex Kuntze



Phytogeographical element: I-T, M

Habitat: Semi-deserts, steppes, xeric shrubs

Elevational range: 350 - 2400 Flowering period: III - IV

Remarks: Therophyte; plant 5–15 cm high; lower nutlet

pustulates short, up to ca. 0.8 mm.

Usefulness: For.

482. Lappula squarrosa (Retz.) Dumort.

Synonyms: Lappula consanguinea (Fisch. & C.A. Mey.) Guerke



Phytogeographical element: Plurireg

Habitat: Orchards and gardens, fields, steppes

Elevational range: 1600 - 2500 Flowering period: V - VI

Remarks: Therophyte, hemicryptophyte; plant 20–40(–60) cm high; fruit 2–3 mm long; disc with obtuse pustulates; style longer than nutlet by 1 mm.

483. Lappula tadshikorum Popov



Phytogeographical element: EI-T Habitat: Alpine semi-deserts, steppes Elevational range: 1600 - 4300 Flowering period: IV - VII

Remarks: Cryptophyte, hemicryptophyte; plant 40–45 cm high; corolla light blue, limb to 4–5 mm across, throat appendages light yellow; glochids on disc usually 3 along center line, to 1 mm, glochids of main row on margin of disc 1.5–2.5 mm.

484. Lepechiniella sarawschanica Popov



Phytogeographical element: E, I-T Habitat: Rocks, loose sandy screes, screes

Elevational range: 2500 - 4200 Flowering period: VII - IX

Remarks: Cryptophyte; plant (7-) 10-15(-25) cm high;

nutlets 3.5–5 mm long, wings entire.

485. Lepechiniella transalaica Popov



Phytogeographical element: EI-T

Habitat: Screes

Elevational range: 4000 - 4500 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 10-25 cm high; nutlets

5–7 mm long, wings coarsely dentate.













486. Lindelofia macrostyla (Bunge) Popov



Phytogeographical element: I-T

Habitat: Juniper forests, broad-leaved forests, steppes, xeric shrubs, thermophilous shrubs, forbs

Elevational range: 700 - 3600 Flowering period: V - VIII

Remarks: Cryptophyte; plant 25–70(–80) cm high; stem branched from middle or base; inflorescence wide, corolla

bluish.

487. Lindelofia olgae Brand



Phytogeographical element: I-T

Habitat: Alpine meadows, alpine swards, pastures,

moraines and snow-beds Elevational range: 2700 - 3900 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 10–40 cm high; stem lower part glabrous; throat appendages 3–4 mm long,

lanceolate-oblong, with humps on margins.

488. Lindelofia stylosa (Kar. & Kir.) Brand



Phytogeographical element: I-T Habitat: Semi-deserts, steppes Elevational range: 3000 - 4500 Flowering period: VI - VII

Remarks: Cryptophyte; plant 20–60 cm high; bottom leaves 10–25 cm long; throat appendages 1–2 mm long,

rectangular or trapezoidal.

489. Lithospermum officinale L.



Phytogeographical element: Plurireg

Habitat: Broad-leaved forests, meadows, fields, steppes,

xeric shrubs, thermophilous shrubs, forbs

Elevational range: 1300 - 3000 Flowering period: V - VI

Remarks: Cryptophyte; plant up to 100 cm high; roots with little or no purple dye; corolla 4-6 mm, tube ca. 2 as long as limb, lobes oblong-ovate, longer than wide, throat appendages short pubescent; nutlets white or yellowish

brown, ovoid, smooth, shiny.

490. Mattiastrum bungei (Boiss.) Rech. f. & Riedl

Synonyms: Paracaryum bungei (Boiss.) Brand



Phytogeographical element: I-T

Habitat: River beds, loose sandy screes, screes

Elevational range: 2000 - 4000

Flowering period: IV - V

Remarks: Therophyte; plant 5-30 cm high; corolla up to 2.5 mm long; nutlets (with wings) 3–3.5 mm in diameter.

491. Mattiastrum himalayense (Klotzsch) Brand

Synonyms: Paracaryum himalayense (Klotzsch) Clarke



Phytogeographical element: I-T

Habitat: River beds, loose sandy screes, screes

Elevational range: 1400 - 4000 Flowering period: V - VII

Remarks: Cryptophyte, hemicryptophyte; plant 10-50(-65) cm high; corolla 3–4(–4.5) mm long, limb 2–2.5 mm long; nutlets (with wings) 0.5–1(–1.2) cm in diameter.





















492. Mertensia dshagastanica Regel



Phytogeographical element: E, I-T Habitat: Nitrophilous rock footings Elevational range: 3000 - 4000 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 5–15 cm high; basal leaves cordate-ovate or subreniform with petiole 3–12 cm, stem leaves 4, alternate; calyx parted to base, 3.5–4 mm; corolla

sky blue, 1.3-1.5 cm.

493. Microcaryum turkestanicum Brand

Synonyms: Eritrichium turkestanicum Franch.



Phytogeographical element: E, I-T

Habitat: Rocks

Elevational range: 2200 - 3200 Flowering period: VI - VII

Remarks: Cryptophyte; plant 2-4 cm high; plant cushion-

like, densely pubescent; nutlets glabrous.

494. Myosotis alpestris F.W. Schmidt



Phytogeographical element: Plurireg Habitat: Meadows, alpine swards, pastures

Elevational range: 2100 - 4500 Flowering period: V - VIII

Remarks: Cryptophyte; plant 10–45 cm high; basal and lower stem leaves petiolate, narrowly oblanceolate to linear-lanceolate; calyx 5-lobed nearly to base, densely pubescent with straight and hooked hairs; pedicel erect, 4–6 mm in fruit; nutlet base without appendages.

495. Myosotis asiatica (Vestergr.) Schischk. & Serg.

Synonyms: Myosotis alpestris F.W. Schmidt subsp. asiatica Vestergr.



Phytogeographical element: E-S Habitat: Alpine meadows Elevational range: 1600 - 3600 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 10–20 cm high; sparsely spreading strigose; upper leaves sessile, narrowly lanceolate to linear-lanceolate, to 4 cm × 2–7 mm; inflorescences up to 10 cm; calyx 1.5–2.5 mm, to 4–5 mm in fruit; corolla blue; tube ca. 2.5 mm; throat appendages ca. 0.5 mm; limb 7–9 mm wide.

496. Myosotis caespitosa K.F. Schultz



Phytogeographical element: Plurireg Habitat: River beds, meadows, pastures

Elevational range: 800 - 3100 Flowering period: V - VI

Remarks: Cryptophyte; plant 10–70 cm high; lower stem nodes without roots; leaf blade oblanceolate to oblong; calyx 5-lobed for 1/2–2/3 its length, sparsely strigose outside; pedicel 6–8 mm in fruit; nutlets ovoid.

497. Myosotis stricta Link ex Roem. & Schult.

Synonyms: Myosotis micrantha Pall. ex Lehm.



Phytogeographical element: Plurireg Habitat: Steppes, thermophilous shrubs

Elevational range: 600 - 2800 Flowering period: IV - VI

Remarks: Therophyte; plant (3–)5–20(–30) cm high; calyx erect, appressed to the flowering axis; lower half of calyx mostly with curved to uncinate hairs; pedicels shorter than the fruiting calyx.























498. Nonea caspica (Willd.) G. Don



Phytogeographical element: Plurireg Habitat: Loose sandy screes, fields, steppes

Elevational range: 400 - 3000 Flowering period: III - IV

Remarks: Therophyte; plant 5–30 cm high; nutlets 2–2.5 mm, attachment scar cupular 0.8–1 mm high, glabrous or short pubescent; corolla white or pink or dark red.

499. Nonea macropoda Popov



Phytogeographical element: E, I-T

Habitat: Steppes, thermophilous shrubs, forbs

Elevational range: 400 - 1000 Flowering period: IV - V

Remarks: Therophyte; plant 7–20(–25) cm high; nutlets (3–) 3.5–4.5 mm, attachment scar cupular 1.2–1.5 mm high with margin finely dentate; corolla white.

500. Onosma albicaulis Popov



Phytogeographical element: E, I-T

Habitat: Loose sandy screes, xeric shrubs, forbs

Elevational range: 1200 - 3400 Flowering period: V - VII

Remarks: Cryptophyte; plant perennial; stems covered by

down directing, stick out and appressed hairs.

501. Onosma atrocyanea Franch.



Phytogeographical element: E, I-T Habitat: Rocks, loose sandy screes, screes

Elevational range: 2400 - 3600 Flowering period: V - VIII

Remarks: Cryptophyte; plant 15–30 cm high; corolla 2.5–3.2 cm long, dark blue or dark purple from the very beginning; calyx 1.5–2 cm long, nectary ringlike hairy.

502. Onosma baldshuanica Lipsky



Phytogeographical element: E, I-T Habitat: Rocks, loose sandy screes, screes

Elevational range: 950 - 2700 Flowering period: III - V

Remarks: Cryptophyte; plant 20–40 cm high; calyx 2–2.5 cm; corolla 3–3.3 cm; nutlets 6–7 mm.

503. Onosma barsczewskii Lipsky



Phytogeographical element: E, I-T Habitat: Rocks, loose sandy screes, screes

Elevational range: 800 - 2300 Flowering period: IV - VI

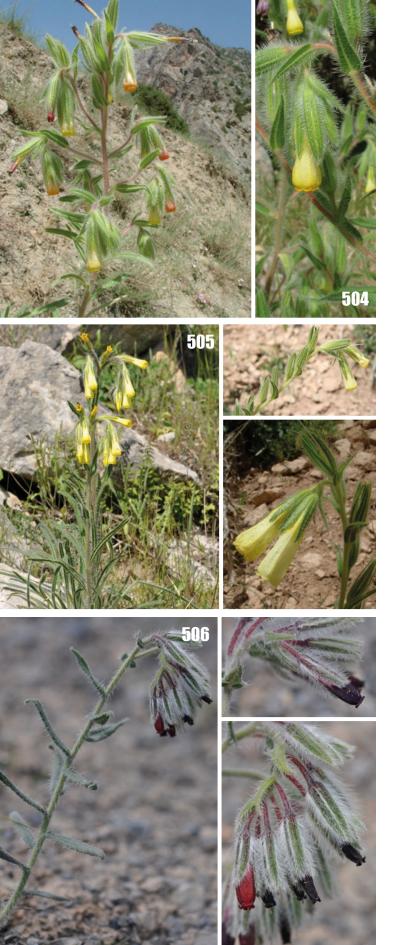
Remarks: Cryptophyte; plant 20-50 cm high; stems covered by closely appressed, up directed hairs.







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504. Onosma dichroantha Boiss.



Phytogeographical element: Plurireg

Habitat: Loose sandy screes, screes, xeric shrubs

Elevational range: 400 - 3000 Flowering period: IV - V

Remarks: Cryptophyte, hemicryptophyte; plant 30–60 cm high; plant pubescent with short (less than 0.5 mm) and long stiff (1–4 mm) hairs; calyx 2–2.5(–3) mm long;

corolla 3-4 mm long.

505. Onosma gmelinii Ledeb.



Phytogeographical element: I-T, EI-T Habitat: Juniper forests, loose sandy screes

Elevational range: 2100 - 2800 Flowering period: V - VII

Remarks: Cryptophyte; plant 20–50 cm high; calyx 1.7–2 cm, corolla 2.5–3 cm and nutlets up to 5 mm long.

506. Onosma maracandica Zakirov



Phytogeographical element: E, I-T Habitat: Loose sandy screes, screes Elevational range: 2900 - 3100 Flowering period: V - VIII

Remarks: Cryptophyte; plant 15–30 cm high; corolla 2–2.2 cm long, dark blue or dark purple from the very beginning; calyx 1–1.2 cm long; nectary ringlike hairy.

507. Onosma zerizamina Lipsky



Phytogeographical element: E, EI-T Habitat: Loose sandy screes, screes Elevational range: 1700 - 2800 Flowering period: VI - VII

Remarks: Cryptophyte; plant (10–)15–40 cm high; leaves lanceolate long–acute to linear with long bristles arranged horizontally along the edges; calyx up to 1 cm long; corolla 1.6–1.8 cm long; filaments at the base glabrous,

almost round, pubescent.

508. Paracynoglossum geometricum (Baker & C.H. Wright) R.R. Mill

Synonyms: *Paracynoglossum glochidiatum* (Wall. ex Benth.) Popov ex Czuk.



Phytogeographical element: I-T, EI-T

Habitat: River beds, riverside forests, screes, fields, xeric

shrubs

Elevational range: 1200 - 3800 Flowering period: V - VII

Remarks: Therophyte; plant 20-60(-70) cm high; leaves 2-6(-7.5) cm long, oblong; corolla 2.5-4 mm long, blue;

nutlest 2.5-3.5 covered with scattered spines.

509. Rindera tetraspis Pall.



Phytogeographical element: I-T, E-S

Habitat: Rocks, screes Elevational range: 500 - 2800 Flowering period: IV - V

Remarks: Cryptophyte; plant 20–70 cm high; leaves covered with small tubercles; corolla 1.1–1.6 cm long; disc

on nutlets glabrous, smooth.



























510. Rochelia bungei Trautv.



Phytogeographical element: I-T Habitat: Juniper forests, steppes Elevational range: 600 - 4000 Flowering period: IV - VI

Remarks: Therophyte; plant 7–25 cm high; calyx in fruit up to 3 mm long and incurved in fruit; nutlets 2–2.5 mm

long covered with tubercles.

511. Rochelia cardiosepala Bunge



Phytogeographical element: I-T Habitat: River beds, screes Elevational range: 700 - 3500 Flowering period: IV - V

Remarks: Therophyte; plant 8–45 cm high; calyx lobes auriculate–cordate at base, completely enclosing the

nutlets.

512. Rochelia disperma (L. f.) K. Koch subsp. retorta (Pall.) Kotejowa

Synonyms: Rochelia retorta (Pall.) Lipsky



Phytogeographical element: M, I-T, E-S

Habitat: Steppes, xeric shrubs, thermophilous shrubs

Elevational range: 800 - 2500

Flowering period: IV

Remarks: Therophyte; plant 7–25 cm high; calyx in fruit 4–6 mm long and incurved in fruit, nutlets ca. 3 mm long

covered with tubercles.

513. Rochelia leiocarpa Ledeb.



Phytogeographical element: I-T, E-S

Habitat: Steppes

Elevational range: 1700 - 3500 Flowering period: IV - VI

Remarks: Therophyte; plant 5–30 cm high; calyx in fruit up to 2–3 mm long and incurved in fruit; nutlets 2–2.5 mm

long, smooth and shiny.

514. Rochelia peduncularis Boiss.



Phytogeographical element: I-T

Habitat: Juniper forests, fields, steppes, xeric shrubs, forbs

Elevational range: 1400 - 3400 Flowering period: IV - V

Remarks: Therophyte; plant 10–30 cm high; calyx in fruit 4–6 mm long; calyx lobes slightly incurved, base broad; fruiting pedicel 7–12 mm in fruit; nutles 3–4 mm long.

515. Solenanthus circinatus Ledeb.



Phytogeographical element: I-T, E-S

Habitat: River beds, riverside forests, pastures, steppes

Elevational range: 700 - 4100 Flowering period: III - VI

Remarks: Cryptophyte; plant 60-120 cm high; basal leaves blade ovate-oblong, $7-15(-20) \times 4-10$ cm, base cordate or subcordate, apex obtuse; inflorescence 15-35 cm long.























516. Solenanthus karateginus Lipsky



Phytogeographical element: SE, I-T

Habitat: Meadows, alpine swards, pastures, forbs

Elevational range: 2000 - 3500 Flowering period: VI - VII

Remarks: Cryptophyte; plant up to 65 cm high; stem pubescent; corolla 5–6(–7) mm long; inflorescence head-

shaped.

517. Solenanthus plantaginifolius Lipsky



Phytogeographical element: E, I-T Habitat: Broad-leaved forests, xeric shrubs

Elevational range: 1000 - 1800 Flowering period: IV - V

Remarks: Cryptophyte; plant 50–60 cm high; leaves 12–45 × 2–12 cm, lanceolate, ovoid or oblong, with winged petioles; corolla 2.5–3.5 mm long, with cilia along the edges of the limbs; nutlets ovate, covered with conical spines.

518. Symphytum asperum Lepech.



Phytogeographical element: Plurireg

Habitat: Ruderal

Elevational range: 500 - 1500 Flowering period: IV - VI

Remarks: Cryptophyte; plant 60–200 cm high; stem roughly haired; leaves alternate with elliptic, lanceolate blade; calyx fused, 5-lobed, 2–5 mm, clearly shorter than corolla tube; corolla bell-shaped, 11–17 mm; lobes with rounded tips; corolla mouth with 5 large, tongue-like scales.

519. Trichodesma incanum (Bunge) DC.



Phytogeographical element: I-T

Habitat: River beds, screes, ruderal, steppes

Elevational range: 600 - 2900 Flowering period: V - VIII

Remarks: Cryptophyte; plant 30–70(–100) cm high; plant with dense white subapressed hairs; leaves elliptic-oblong to ovate; calyx 1–2 cm long; corolla 1.5–3 cm in diameter;

anthers densely villous, awned.

520. Trichodesma incanum (Bunge) DC.var. glabrescens (Czuk.)M. Nobis & A. Nowak



Phytogeographical element: I-T

Habitat: River beds, screes, ruderal, steppes

Elevational range: 600 - 1500 Flowering period: VI - VIII

Remarks: Cryptophyte; This taxon differs from *T. incanum* var. *incanum*, by scabrous leaves, cover by cling hairs (not

softly, long pubescent as it is typical variety).

521. Aethionema carneum (Banks & Sol.) B. Fedtsch.

Synonyms: Campyloptera carnea (Banks & Soland.) Botsch. & Vved., Thlaspi carneum Banks & Soland.



Phytogeographical element: I-T, S-S, M Habitat: River beds, loose sandy screes

Elevational range: 700 - 1700 Flowering period: III - VI

Remarks: Therophyte; plant 4–15(–25) cm high; cauline

leaves thick, sessile, nearly cordate at base.















522. Alliaria petiolata (M. Bieb.) Cavara & Grande



Phytogeographical element: Plurireg

Habitat: Broad-leaved forests, riverside forests

Elevational range: 1100 - 2500 Flowering period: IV - VII

Remarks: hemicryptophyte; plant 5–20 cm high; siliques

(2-)4-7 cm long and 1-2.5 mm wide.

Usefulness: Med, For, Foo.

523. Alyssum dasycarpum Stephan ex Willd.

Synonyms: $Psilonema\ dasycarpum$ (Stephan ex Willd.) C.A. Mey.



Phytogeographical element: I-T, M, E-S Habitat: Semi-deserts, steppes, forbs Elevational range: 400 - 2200 Flowering period: IV - V

Remarks: Therophyte; plant 4–26 cm high; stamen filaments not dentate; silicles $3-3.5 \times 2.5-3$ mm.

524. Alyssum desertorum Stapf

Synonyms: Alyssum turkestanicum Regel & Schmalh. var. desertorum (Stapf) Botsch., A. minimum Willd.



Phytogeographical element: I-T, M, E-S

Habitat: River beds, steppes, thermophilous shrubs, forbs

Elevational range: 350 - 2600 Flowering period: II - VI

Remarks: Hemicryptophyte; plant (2–)5–26 cm high; stamen filaments dentate; silicles bent, glabrous or

pubescent with 8-18 branched hairs.

Usefulness: Med, For.

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525. Alyssum linifolium Stephan ex Willd.

Synonyms: Meniocus linifolius (Steph.) DC.



Phytogeographical element: I-T, M, E-S Habitat: Steppes, thermophilous shrubs

Elevational range: 350 - 3600 Flowering period: II - VI

Remarks: Therophyte; plant (4–)7–30 cm high; stamen filaments with one narrow appendage; silicles broadly elliptic, 4–6.5 mm long and 2.5 mm wide; valves

compressed, glabrous.

526. Alyssum stenostachyum Botsch. & Vved.



Phytogeographical element: I-T

Habitat: Juniper forests, riverside forests, fields,

thermophilous shrubs Elevational range: 1100 - 2000 Flowering period: V - VI

Remarks: Therophyte; plant 10–30 cm high; stamen filaments

dentate; silicles pubescent with 3-8-branched hairs.

527. Arabidopsis pumila (Steph.) N. Busch



Phytogeographical element: I-T, E-S

Habitat: Semi-deserts, salt marshes, thermophilous

shrubs, forbs

Elevational range: 300 - 2100 Flowering period: III - VIII

Remarks: Therophyte; plant (1–)5–40(–60) cm high; stem leaves amplexicaul; only stellate hairs on stems; petals

2.5–3 mm. Usefulness: For.



















528. Arabidopsis thaliana (L.) Heynh.

Synonyms: Arabis thaliana L., Stenophragma thalianum (L.) Čelak.



Phytogeographical element: Plurireg

Habitat: Broad-leaved forests, xeric shrubs, thermophilous

shrubs, forbs

Elevational range: 800 - 3000 Flowering period: IV - VIII

Remarks: Therophyte; plant 10–40 cm high; stem in lower section pubescent with simple hairs; cauline leaves not

amplexicaul. Usefulness: For, Foo.

529. Arabis karategina Lipsky



Phytogeographical element: E, I-T

Habitat: Rocks

Elevational range: 1200 - 2700 Flowering period: IV - VII

Remarks: Cryptophyte; plant 7–28 cm high; rossette leaves oblong-spatulate; siliques glabrous, slightly bent

horizontally or downwards.

530. Arabis kokanica Regel & Schmalh.



Phytogeographical element: SE, I-T

Habitat: Rocks, screes, moraines and snow-beds

Elevational range: 2250 - 4000 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 10–25 cm high; rossette leaves lanceolate or spatulate; siliques glabrous, stright.

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531. Arabis recta Vill.

Synonyms: Arabis auriculata auct., A. montbretiana Boiss.



Phytogeographical element: I-T, E-S, M Habitat: River beds, rocks, steppes Elevational range: 600 - 2400 Flowering period: III - VI

Remarks: Therophyte; plant (3-) 10-30(-40) cm high;

peduncles and siliques glabrous.

Usefulness: For.

532. Asperuginoides axillaris (Boiss. & Hohen.) Rauschert

Synonyms: Buchingera axillaris Boiss. & Hohen.



Phytogeographical element: I-T

Habitat: River beds, broad-leaved forests

Elevational range: 1000 - 2600 Flowering period: III - VI

Remarks: Therophyte; plant 10-50(-83) cm high; plant

pubescent with branched barbed hairs.

533. Atelanthera perpusilla Hook, f. & Thomson

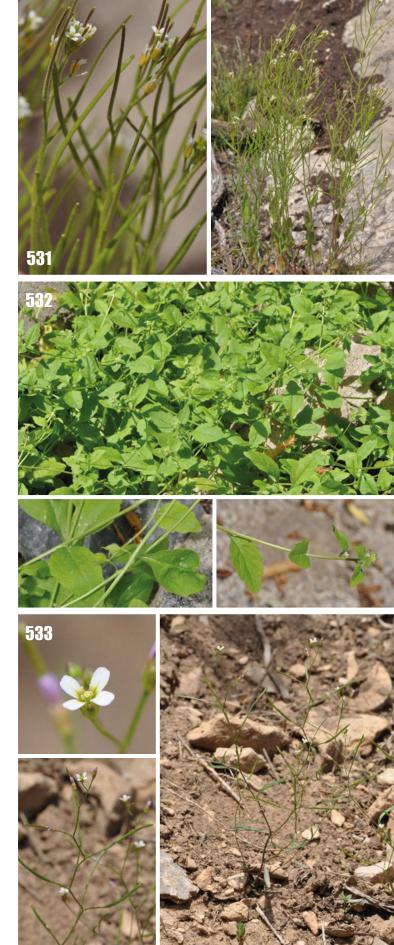
Synonyms: Atelanthera pentandra Jafri



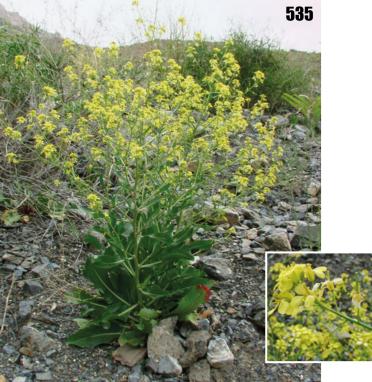
Phytogeographical element: I-T Habitat: Rocks, screes Elevational range: 3300 - 4100 Flowering period: VI - VIII

Remarks: Therophyte; plant (1–)2–10 cm high; basal leaves

not formed; petals white later becoming purplish.









534. Barbarea vulgaris R. Br.

Synonyms: Barbarea arcuata (Opiz.) Reichb.



Phytogeographical element: Plurireg Habitat: Meadows, fens and mires Elevational range: 700 - 3000 Flowering period: III - IX

Remarks: hemicryptophyte; plant 30-80 cm high; basal and lowermost cauline leaves petiolate, upper leaves cauline, ovate; fruit linear, 1.5-3 cm \times 1-1.5 mm, terete, somewhat

compressed, or 4-angled, torulose.

535. Brassica elongata Ehrh. subsp. integrifolia (Boiss.) Breistr.

Synonyms: Erucastrum armoracioides (Czern. ex Turcz.) Cruchet



Phytogeographical element: Plurireg

Habitat: Steppes, ruderal Elevational range: 600 - 1700 Flowering period: IV - VI

Remarks: hemicryptophyte; plant up to 130 cm high basally hirsute or rarely glabrous; stems erect, branched basally and above; fruiting pedicels divaricate, 0.8-1.8 cm; sepals oblong $3-4 \times 1-1.5$ mm, erect or rarely ascending; petals yellow $6-8.5 \times 2.5-3.5$ mm, obovate, apex rounded; fruit linear 2-4 cm 1.5-2 mm, terete or slightly flattened; seeds brown or grayish, globose, 1-1.5 mm in diameter, minutely reticulate.

536. Brassica rapa L.

Synonyms: Brassica campestris L.



Phytogeographical element: I-T, M

Habitat: Ruderal, fields Elevational range: 800 - 3800 Flowering period: V - IX

Remarks: Therophyte; plant 18-97 cm high, with

amplexicaul leaves; petals 7–10 mm.

Usefulness: For, Foo, Hou.

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537. Braya humilis (C.A. Mey.) B.L. Rob.

Synonyms: *Neotorularia humilis* (C.A. Mey.) Hedge & J. Léonard, *Sisymbrium humile* C.A. Mey., *Torularia humilis* (C.A. Mey.) O.E. Schulz



Phytogeographical element: EI-T, E-S, Arctic Habitat: Alpine meadows, fens and mires, pastures

Elevational range: 3400 - 4300 Flowering period: VI - VIII

Remarks: Therophyte, cryptophyte, hemicryptophyte; Fruit (9–) 12–25(–32) × 0.5–0.9(–1) mm, uniform in width; petals 3–5 (–8) mm; seeds uniseriate; racemes bracteate along lowermost portion, rarely throughout.

538. Braya pamirica (Karsh.) O. Fedtsch.



Phytogeographical element: E, EI-T Habitat: Alpine semi-deserts, alpine steppes

Elevational range: 3600 - 5000 Flowering period: VII - IX

Remarks: Cryptophyte; plant (2–) 5–15 cm high; leaves densely pubescent with branched hairs; petals yellow.

539. Braya rosea (Turcz.) Bunge

Synonyms: Braya brachycarpa Vass.



Phytogeographical element: E, EI-T

Habitat: Fens and mires, alpine semi-deserts

Elevational range: 2700 - 4500

Flowering period: VI

Remarks: Cryptophyte; plant (1–)3–10(–16) cm; petals white, lavender, or purple; inflorescence ebracteate; caudex few branched or simple, often with few or no petiolar remains; at least some trichomes forked; fruit often longer than sepals.















540. Camelina microcarpa Andrz. ex DC. subsp. sylvestris (Wallr.) Hiitonen

Synonyms: Camelina sylvestris Wallr.



Phytogeographical element: Plurireg Habitat: Arable fields, fallows Elevational range: 350 - 2800 Flowering period: IV - VI

Remarks: Therophyte; plant 30–80 cm high; sepals pubescent; legumes 4–7 mm long; style 2–2.5 mm long.

541. Camelina sativa (L.) Crantz

Synonyms: Camelina glabrata (DC.) Fritsch ex N.W. Zinger, C. sativa (L.) Crantz var. glabrata DC., Myagrum sativum L.



Phytogeographical element: Plurireg Habitat: Arable fields, fallows Elevational range: 400 - 450 Flowering period: IV - V Remarks: Therophyte; plant

(12–)30–80(–100) cm high; sepals glabrous; legumes 7–9 mm long, ovoid-oblong; style 1–1.5 mm.

542. Capsella bursa-pastoris L.

Synonyms: Thlaspi bursa-pastoris L.



Phytogeographical element: Plurireg

Habitat: Arable fields, fallows, roadsides, meadows

Elevational range: 350 - 3800 Flowering period: IV - VI

Remarks: Therophyte; plant 10-50(-70) cm high; basal leaves rosulate, leaf blade oblong or oblanceolatec, cauline leaves sessile, sagittate, narrowly oblong, lanceolate, or linear; fruit $(3-)4-9(-10) \times (2-)3-7$ (-9) mm, flat.

543. Cardamine densiflora Gontsch.



Phytogeographical element: E, I-T Habitat: Riverside forests, fens and mires

Elevational range: 2700 - 3400 Flowering period: VII - IX

Remarks: Cryptophyte; plant 18–65 cm high; flower pedicels up to 5 mm; terminal leaflets lanceolate.

544. Cardamine impatiens L.



Phytogeographical element: I-T, E-S, M

Habitat: Broad-leaved forests, riverside forests, forbs,

springs

Elevational range: 1200 - 2500 Flowering period: V - VII

Remarks: Therophyte; plant (12–) 20–65(–90) cm high; cauline leaves (9–)13–23-foliolate; petiole auriculate.

545. Chorispora bungeana Fisch. & C.A. Mey.

Synonyms: Chorispora exscapa Bunge



Phytogeographical element: I-T, E-S

Habitat: Alpine swards, alpine semi-deserts, moraines and

snow-beds

Elevational range: 2200 - 4200 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 2–10 cm high covered with straight hairs or glabrous; all flowers borne on solitary pedicels arising from basal rosette; petals purple.

















546. Chorispora macropoda Trautv.



Phytogeographical element: I-T Habitat: Fens and mires, forbs Elevational range: 2200 - 4500 Flowering period: V - VIII

Remarks: Cryptophyte; plant (3–)7–20 cm high; leaf blades and petioles covered with glandular hairs, margin of

petioles covered with straight hairs.

Usefulness: For.

547. Chorispora sabulosa Cambess.

Synonyms: Chorispora elegans Cambess.



Phytogeographical element: I-T

Habitat: Alpine swards, alpine semi-deserts, moraines and

snow-beds

Elevational range: 2900 - 4800 Flowering period: VII - IX

Remarks: Cryptophyte; plant 3–15 cm high; petals 7–8 mm, sepals 3–4 mm; leaf blade glabrous with the only tuft of apical hairs; petioles with solitary straight hairs and glandular hairs or glabrous on margin.

Usefulness: For.

548. Chorispora sibirica (L.) DC.



Phytogeographical element: EI-T, E-S Habitat: Screes, semi-deserts, alpine steppes

Elevational range: 1500 - 3800 Flowering period: VI - VIII

Remarks: Therophyte; plant up to 30 cm high with multicellular glandular trichomes; flowers in racemes, fruiting pedicels slender 7–10 mm, slightly recurved, glandular; sepals narrowly oblong, $3-4\times1-2$ mm, petals bright yellow, broadly obovate, $7-9\times3-4$ mm, emarginate at apex; fruit linear, 1.4-2 cm 1.5-2 mm, slightly curved upward, strongly torulose and with 6-12 constrictions, glandular.

549. Christolea crassifolia Cambess.

Synonyms: Ermania crassifolia (Camb.) Ovcz. & Junuss.



Phytogeographical element: EI-T

Habitat: River beds, alpine semi-deserts, alpine steppes

Elevational range: 3650 - 4300 Flowering period: VI - IX

Remarks: Cryptophyte; plant (8–)15–40(–50) cm high, with a woody caudex; petals 5–6.5 mm; fruiting pedicels ascending; fruit 1.5–3(–3.5) cm, straight, subappressed to

rachis, valve apex acute or acuminate.

550. Christolea crassifolia var. pamirica (Korsh.) Korsh.

Synonyms: Christolea pamirica Korsh., Ermania pamirica (Korsh.) Ovcz. & Junuss.



Phytogeographical element: EI-T

Habitat: River beds, alpine semi-deserts, alpine steppes

Elevational range: 3200 - 4400 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 7–25 cm high, glabrous or slightly pubescent; petals yellow, purplish at base; silicles

widely obovate, glabrous.

Usefulness: For.

551. Clypeola jonthlaspi L.



Phytogeographical element: I-T, M, E-S

Habitat: Salt shrubs, steppes, thermophilous shrubs

Elevational range: 400 - 1800 Flowering period: III - VI

Remarks: Therophyte; plant 7-20(-29) cm high; silicles

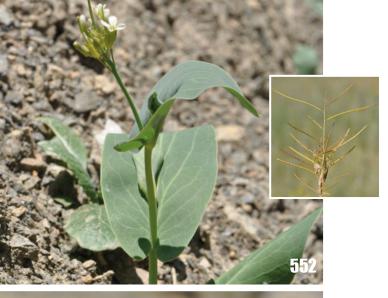
with 1 seed, pendent, winged.

Usefulness: For.













552. Conringia orientalis (L.) Dumort.

Synonyms: Brassica orientalis L.



Phytogeographical element: I-T, M, S-S

Habitat: River beds, fields Elevational range: 800 - 2500 Flowering period: IV - VIII

Remarks: Therophyte; plant 10–48 cm high; fruit peduncles 6–10 mm long, flowers pale yellow.

Usefulness: Foo.

553. Conringia persica Boiss.



Phytogeographical element: I-T Habitat: River beds, fields, screes Elevational range: 1900 - 2800 Flowering period: V - VIII

Remarks: Therophyte; plant 7–25 cm hifh; petals 3.5–4 (–5) mm long, 2 mm broad; siliquae 3–4 cm long; seeds 1 mm long; pedicel c. 4 mm long and thickened in fruit.

554. Conringia planisiliqua Fisch. & C.A. Mey.



Phytogeographical element: I-T

Habitat: Loose sandy screes, screes, ruderal, fields, steppes

Elevational range: 1600 - 3800 Flowering period: V - VIII

Remarks: Therophyte; plant (10–)15–50(–100) cm high; peduncles distinctly narrower than siliques; petals yellow,

later whitish with brown veins.

555. Crambe cordifolia Steven subsp. kotschyana (Boiss.) Jafri

Synonyms: Crambe kotschyana Boiss.



Phytogeographical element: I-T Habitat: Screes, forbs Elevational range: 700 - 2400 Flowering period: IV - VII

Remarks: Cryptophyte; plant 0.5–1.8(–2.5) m high; petals white; terminal fruit segment globular, 4–8 mm long.

Usefulness: Med, For.

556. Crambe orientalis L.



Phytogeographical element: A, M, I-T

Habitat: Ruderal, fields Elevational range: 1400 - 1600 Flowering period: V - VI

Remarks: Cryptophyte; plant up to 1.2 m high; leaves dentate and deeply pinnately lobed; corolla white.

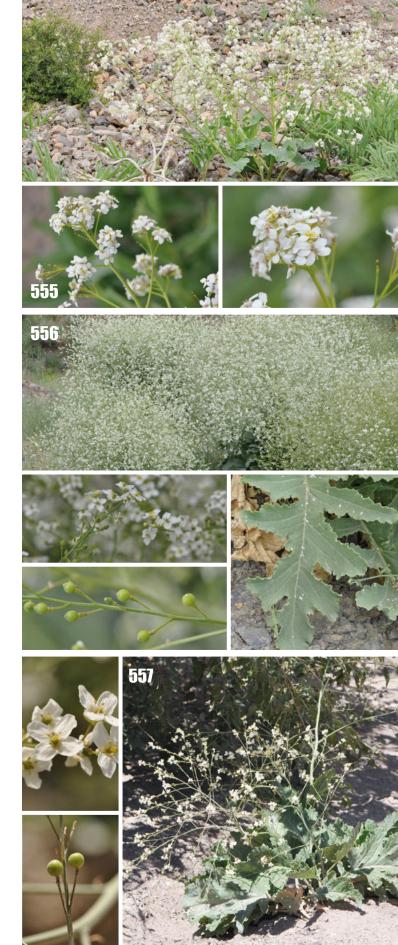
557. Crambe schugnana Korsh.



Phytogeographical element: I-T Habitat: Rocks, screes Elevational range: 700 - 2800 Flowering period: VI - VII

Remarks: Cryptophyte; plant 64–100 cm high; stems at base and leaves hirsute; terminal fruit segment up to

2.5 mm.



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558. Crucihimalaya wallichii (Hook. f. & Thomson) Al-Shehbaz, O'Kane & R.A. Price

Synonyms: *Arabidopsis wallichii* (Hook. fil. & Thoms.) N. Busch, *Sisymbrium wallichii* Hook. f. & Thomson



Phytogeographical element: I-T Habitat: River beds, rocks, steppes Elevational range: 850 - 4000 Flowering period: VI - VIII

Remarks: Hemicryptophyte; plant (5–)12–50(–80) cm high; basal leaves not so elongated, much shorter than the flowering stem, canescent with conspicuous long and

short hairs; flowers ca 3.5 mm across.

559. Cryptospora falcata Kar. & Kir.

Synonyms: Cryptospora omissa Botsch.



Phytogeographical element: I-T Habitat: Meadows, steppes Elevational range: 400 - 4500 Flowering period: IV - V

Remarks: Therophyte; plant (6–)10–40(–60) cm high; fruit indehiscent, breaking transversely into 1-seeded segments; septum absent; lowermost parts of plant with

stalked trichomes.

560. Cryptospora trichocarpa Botsch.



Phytogeographical element: E, I-T Habitat: Meadows, steppes Elevational range: 600 - 800

Flowering period: V

Remarks: Therophyte; plant 25–40 cm high; siliques dansely covered with straight and bisected hairs.

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561. Cymatocarpus heterophyllus (Popov) N. Busch

Synonyms: Cymatocarpus popovii Botsch. & Vved., Sisymbrium heterophyllum Popov



Phytogeographical element: SE, I-T

Habitat: Meadows, steppes, thermophilous shrubs

Elevational range: 350 - 800 Flowering period: IV - V

Remarks: Therophyte; plant 10–36(–50) cm high; lower leaves bipinnatisect, pubescent; siliques 7–32 mm long.

562. Descurainia sophia (L.) Webb ex Prantl

Synonyms: Sisymbrium sophia L.



Phytogeographical element: Plurireg Habitat: Pastures, ruderal, fields Elevational range: 300 - 4300 Flowering period: III - VIII

Remarks: Therophyte; plant 30–90 cm high; siliques linear, 15–35 mm long, ca. 1 mm broad, often up curved,

glabrous. Usefulness: Med.

563. Didymophysa fedtschenkoana Regel



Phytogeographical element: I-T

Habitat: River beds, screes, moraines and snow-beds

Elevational range: 3000 - 4600 Flowering period: VII - IX

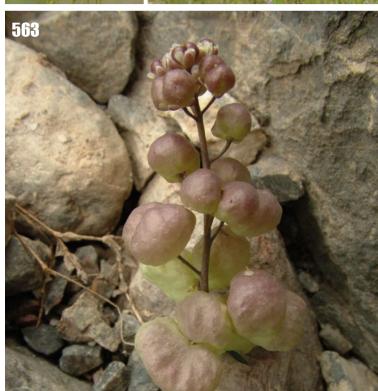
Remarks: Cryptophyte; plant procumbent, stem 5-20 cm long; leaves oblong to lanceolate, upper occasionally with 1-2 teeth; inflorescence dense, cylindrical; sepals 1.5-2 mm, petals 1.5-3 mm; fruit 4-8 mm wide, swollen when

mature.









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564. Dilophia salsa Thomson



Phytogeographical element: EI-T

Habitat: River beds, fens and mires, salt marshes

Elevational range: 3550 - 4000 Flowering period: VI - VII

Remarks: Cryptophyte, hemicryptophyte; plant 2–8 cm high; petals spatulate or spatulate–linear, 1.8–2.5(–3.2) 0.5–1(–1.5) mm; anther apicula triangular, 0.05–0.1 mm, apex acute; seeds (2–)4–8(–12) per fruit, 0.7–1.1(–1.5) × 0.5–6 mm.

565. Draba alajica Litv.



Phytogeographical element: E, EI-T Habitat: Screes, alpine steppes Elevational range: 3400 - 3800 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 5–16 cm high; leaves only in rosette, silicles pubescent, leaves and sepals without

unbranched hairs.

566. Draba altaica (C.A. Mey.) Bunge

Synonyms: Draba rupestris R. Br. var. altaica C.A. Mey.



Phytogeographical element: I-T

Habitat: Alpine meadows, fens and mires, alpine steppes

Elevational range: 3300 - 5000 Flowering period: VI - VIII

Remarks: Cryptophyte; plant (1–) 2–8(–10) cm high; flowering stems with leaves or leafless; peduncles 1–2 mm long; petals white, 2–2.5 mm long; silicles glabrous,

2.5–6 mm long, 1–1.5 mm wide.

567. Draba darwasica Lipsky



Phytogeographical element: E, EI-T

Habitat: Rocks, screes

Elevational range: 3000 - 4500 Flowering period: VII - VIII

Remarks: Cryptophyte; plant ca. up to 10 cm high; flowering stems leafless; peduncles 7–15 mm long, thin; silicles oblong-eliptic to widely ovoid, pubescent with branched hairs, 7–11 mm long, 3–5 mm wide, pistil style

3–4.5 mm long.

568. Draba lanceolata Royle



Phytogeographical element: Plurireg

Habitat: Rocks, loose sandy screes, screes, steppes

Elevational range: 1500 - 4100 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 7–35 cm high; stem with leaves, silicles pubescent; fruit peduncles 3–10 mm, petals

2.5–4 mm. Usefulness: For.

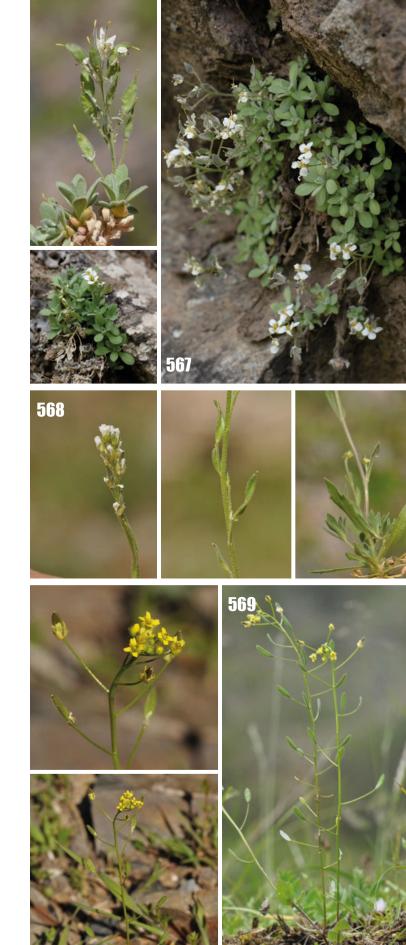
569. Draba nemorosa L.



Phytogeographical element: Plurireg Habitat: Meadows, steppes, forbs Elevational range: 2400 - 2900 Flowering period: V - VII

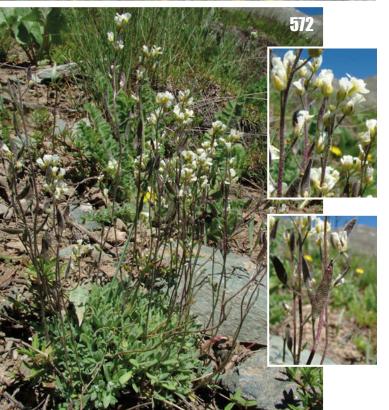
Remarks: Cryptophyte; plant (3–)7–28 cm high; stem with leaves, pubescent only in lower section; petals pale yellow

1.5-2 mm.









570. Draba oreades Schrenk



Phytogeographical element: I-T

Habitat: Alpine swards, screes, alpine semi-deserts

Elevational range: 3200 - 4300 Flowering period: VII - VIII

Remarks: Cryptophyte; plant up to 10 cm high; flowering stems leafless, covered with straight and forked hairs, rarely almost glabrous; peduncles 2.5–4 mm long, pubescent with straight hairs, rarely glabrous; petals yellow, 3.5–4.5 mm long; silicles glabrous or covered with scattered short straight andf forked hairs, 4–5 mm long, 3–4 mm wide, pistil style 0.8–1.2 mm long.

571. Draba pamirica (O. Fedtsch.) Pohle

Synonyms: Draba alpina L. var. pamirica O. Fedtsch.



Phytogeographical element: E, EI-T

Habitat: Alpine swards, screes, moraines and snow-beds

Elevational range: 3700 - 5000 Flowering period: VII - VIII

Remarks: Cryptophyte; plant up to 10 cm high; flowering stems leafless, covered with branched hairs only sometimes wih admixture of straight hairs; peduncles 2.5–5 mm long, thin, glabrous; petals yellow, 3.5–5 mm long; silicles glabrous, 4–8 mm long, 3–5 mm wide, pistil style 0.5–1 mm long.

572. Draba tibetica Hook, f. & Thomson

Synonyms: *Draba tranzschelii* Litv., *D. turkestanica* Regel & Schmalh.



Phytogeographical element: I-T

Habitat: Rocks, pastures, alpine steppes, forbs

Elevational range: 2900 - 4000 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 6–25 cm high; flowering stems leafless; peduncles 5–14 mm long; silicles lanceolate, 7–15 mm long, 1.7–3 mm wide, covered with branched and forked hairs; pistil style 0.5–1 mm long.

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573. Draba yunussovii Tolm.



Phytogeographical element: E, I-T Habitat: Screes, moraines and snow-beds

Elevational range: 4000 - 4100 Flowering period: VIII

Remarks: Cryptophyte; plant flowering stems leafless; peduncles 2–4 mm long dansely covered with branched hairs; silicles ovoid, 2–5 mm long, 1.5–3 mm wide, dansely covered with branched hairs; pistil style 0.5–0.75 mm long.

574. Eruca vesicaria (L.) Cav.

Synonyms: Eruca sativa Mill.



Phytogeographical element: I-T, M, E-S

Habitat: Ruderal, fields Elevational range: 400 - 3800 Flowering period: IV - VIII

Remarks: Therophyte; plant stem 20–73 cm high; siliques

8–21 mm with beak 5–9 mm. Usefulness: Med, Foo.

575. Erysimum alaicum Novopokr. ex Nikitina



Phytogeographical element: E, I-T

Habitat: Juniper forests, broad-leaved forests, screes,

steppes, xeric shrubs, forbs Elevational range: 1700 - 3200 Flowering period: V - VI

Remarks: Hemicryptophyte; plant (13–)35–80 cm high; rosette leaves oblong-ovoid, entire; petals 10–13 mm, with 4–7 mm wide ligule; fruit 4-angled 1–4 cm; adhered to the stem.

o tne stem.



















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576. Erysimum altaicum C.A. Mey.

Synonyms: Erysimum altaicum C.A. Mey. var. humillimum C.A. Mey., E. humillimum (C.A. Mey.) N. Busch



Phytogeographical element: EI-T Habitat: Alpine semi-deserts Elevational range: 3200 - 4500 Flowering period: VI - VIII

Remarks: Cryptophyte; plant (5–) 14–24 cm high; hairs mostly 2-partite, appressed; flowers large, ca. 10 mm across; petals 5–6 mm broad; siliques erect with stigma on 2–3 mm long style; pedicels (3–)5–10 mm long in fruit, slightly thickened; leaves narrowly linear, 1–3 mm broad.

577. Erysimum diffusum Ehrh.



Phytogeographical element: I-T, E-S, M

Habitat: Broad-leaved forests, steppes, xeric shrubs

Elevational range: 1500 - 3000 Flowering period: VI - IX

Remarks: Hemicryptophyte; plant 20–78(–115) cm high; leaves linear, entire; siliques with 2-branched hairs; petals

11-13 mm long.

578. Erysimum hieraciifolium L. f.



Phytogeographical element: I-T, E-S

Habitat: Juniper forests, broad-leaved forests, riverside

forests, pastures

Elevational range: 2100 - 3700 Flowering period: VI - VIII

Remarks: Hemicryptophyte; plant 30–70(–100) cm high; siliques with 3–4-branched hairs; sepals 3–5 mm long.

579. Erysimum samarkandicum Popov



Phytogeographical element: E, I-T Habitat: Juniper forests, xeric shrubs Elevational range: 1500 - 2900 Flowering period: VI - VII

Remarks: Cryptophyte; plant 25–60 cm high; petals 11–14 mm long, siliques adjacent to stem.

580. Euclidium syriacum (L.) R. Br.

Synonyms: Anastatica syriaca L.



Phytogeographical element: I-T, M, E-S

Habitat: Ruderal, fields Elevational range: 350 - 3800 Flowering period: III - VII

Remarks: Therophyte; plant (4–)10–40(–45) cm high;

petals white; fruit scabrous.

Usefulness: For.

581. Eutrema altaicum (C.A. Mey.) Al-Shehbaz & Warwick

Synonyms: Taphrospermum altaicum C.A. Mey.



Phytogeographical element: EI-T, E-S

Habitat: Rocks, screes Elevational range: 3500 - 4700

Flowering period: VII - VIII

Remarks: Cryptophyte; plant (4–)10–23(–30) cm high; leaf margin entire or rarely repand; fruit narrowly conical, torulose, (1.8–)2–2.5(–3) mm wide; septum complete or

rarely reduced to a rim; cotyledons incumbent.













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582. Eutrema integrifolium (DC.) Bunge



Phytogeographical element: I-T

Habitat: Alpine meadows, moraines and snow-beds,

springs

Elevational range: 3000 - 3300 Flowering period: VII - VIII

Remarks: Cryptophyte; plant (30–) 40–80(–90) cm high, glabrous throughout; middle cauline leaves sessile, uppermost leaves cuneate at base; silicles 5–8(–10) mm

long.

583. Goldbachia pendula Botsch.



Phytogeographical element: I-T, E-S

Habitat: Screes, fields, thermophilous shrubs

Elevational range: 1000 - 4000 Flowering period: IV - VIII

Remarks: Therophyte; plant (10–)14–40(–50) cm high; cauline leaves often denticulate, sparsely ciliate; mature fruit terete or slightly 4-angled, abruptly constricted to beaklike apex 0.5–1.5 mm; fruiting pedicels (4–)6–10(–12) mm, slightly shorter or slightly longer than fruit.

584. Goldbachia torulosa DC.



Phytogeographical element: I-T, E-S, M Habitat: Thermophilous shrubs, forbs Elevational range: 400 - 3900 Flowering period: III - VIII

Remarks: Therophyte; plant 10-57 cm high; fruits without

vesicles.

585. Goldbachia verrucosa Kom.



Phytogeographical element: I-T, M

Habitat: Fields, steppes, thermophilous shrubs

Elevational range: 900 - 2400 Flowering period: IV - VI

Remarks: Therophyte; plant 15–59 cm high; fruits generally 1-celled, without middle constriction, markedly beset with minute vesicles; pedicels much longer than the fruits; pods usually 4–5 mm long, pedicels ca.

10(-12) mm long.

586. Hornungia procumbens (L.) Hayek

Synonyms: Hymenolobus procumbens (L.) Nutt.



Phytogeographical element: Brassicaceae, Plurireg

Habitat: River beds, salt marshes Elevational range: 350 - 4000 Flowering period: V - IX

Remarks: Therophyte; plant (2–) 5–22(–30) cm high; racemes ebracteate; fruit oblong, elliptic, or obovate.

Usefulness: For.

587. Isatis minima Bunge



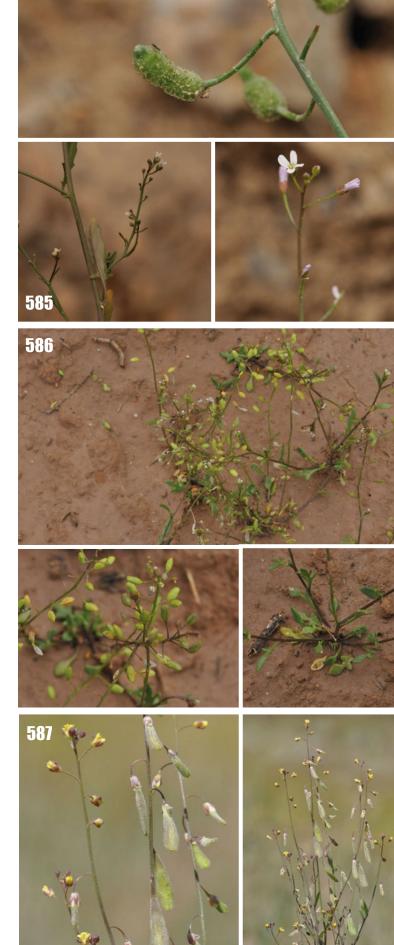
Phytogeographical element: I-T

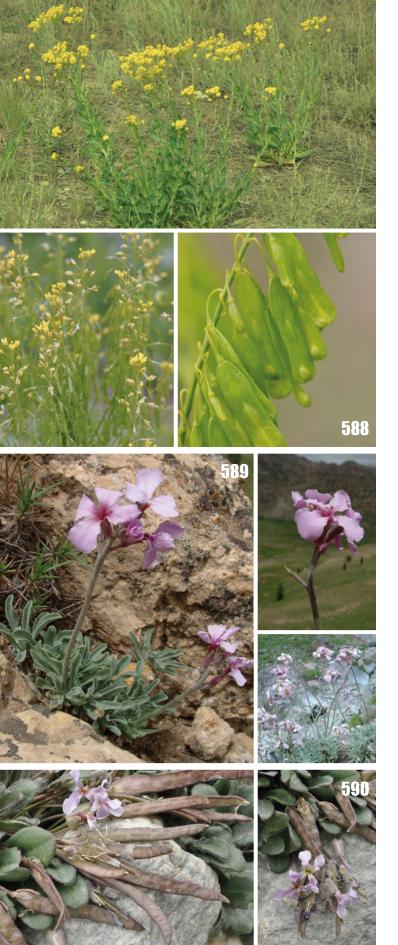
Habitat: Salt shrubs, salt marshes, steppes

Elevational range: 400 - 600 Flowering period: IV - V

Remarks: Therophyte; plant (6–)12–40(–60) cm; fruit winged only above the middle, constricted and often curved at middle, spatulate, often with crisped trichomes;

petals 1–2 mm. Usefulness: For.





588. Isatis tinctoria L.



Phytogeographical element: A, I-T, E-S, M Habitat: Orchards and gardens, ruderal

Elevational range: 700 - 2100 Flowering period: IV - VI

Remarks: Hemicryptophyte; plant (30–)40–100(–150) cm; fruit winged all around, elliptic, oblong-oblanceolate, elliptic-obovate or rarely oblong, apex subacute, rounded, or rarely subemarginate; fruit only with a prominent midvein and inconspicuous lateral veins, widest above middle, black or blackish brown.

Usefulness: Med, For.

589. Iskandera hissarica N. Busch



Phytogeographical element: E, I-T Habitat: Rocks, screes Elevational range: 2600 - 3200 Flowering period: VII - VIII

Remarks: Chamaephyte; plants covered with branched

capitate glandular hairs.

590. Leiospora bellidifolia (Danguy) Botsch. & Pachom.

Synonyms: Parrya bellidifolia Danguy



Phytogeographical element: SE, EI-T

Habitat: River beds

Elevational range: 3200 - 3300 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 5-10 cm high; flowers in

shortly pedunculate racemes.

591. Leiospora pamirica (Botsch. & Vved.) Botsch. & Pachom.

Synonyms: Parrya pamirica Botsch. & Vved.



Phytogeographical element: EI-T

Habitat: Alpine meadows, alpine swards, screes

Elevational range: 3900 - 4950 Flowering period: VII - IX

Remarks: Cryptophyte; plant 5–10(–15) cm high, often densely pubescent, rarely glabrescent; leaf and calyx trichomes short-stalked, forked, mixed with simple ones; petiole broadened at base, ciliate; flowers on solitary pedicels from center of rosette, 2–7 per rosette; seeds orbicular uni- or biseriate, flattened, broadly winged.

592. Leiospora subscapigera Botsch. & Pachom.

Synonyms: Parrya subscapigera Botsch. & Vved.



Phytogeographical element: SE, I-T Habitat: Screes, moraines and snow-beds

Elevational range: 2900 - 3600 Flowering period: VI - IX

Remarks: Cryptophyte; plant 5–10(–15) cm high, covered with scattered long straight hairs or sometimes wit admixture of forked hairs; leaves glabrous, obovate or roundish, thick, entire, abruptly or gradually narrowed into a long petiole; siliques glabrous.

593. Lepidium cordatum Willd. ex Steven



Phytogeographical element: EI-T

Habitat: Alpine semi-deserts, salt marshes

Elevational range: 3000 - 3900 Flowering period: VII - IX

Remarks: Cryptophyte; plant 15–40 cm high, glabrous; cauline leaves sessile, basal and lowermost cauline leaves pinnatifid, upper ones subentire; fruit suborbicular or

broadly ovate-cordate.













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594. Lepidium densiflorum Schrad.



Phytogeographical element: A, I-T, E-S

Habitat: River beds, fields Elevational range: 1500 - 4100 Flowering period: VII - VIII

Remarks: Therophyte, hemicryptophyte; plant (10-)25-50(-65) cm high; cauline leaves shortly petiolate; leaf blade narrowly oblanceolate or linear, irregularly serrulate or dentate, rarely subentire; fruit broadly obovate, widest above middle; raceme papillae terete or subclavate.

595. Lepidium didymum L.

Synonyms: Coronopus didymus (L.) Smith



Phytogeographical element: A, Plurireg

Habitat: Ruderal, fields Elevational range: 850 - 1250 Flowering period: IV - VI

Remarks: Therophyte; plant 15-30 cm high; branched mostly from below, glabrous or hairy; basal and lower leaves rosulate, pinnatisect, stalked, 6-10 jugate, 5-10 cm long; upper leaves similar or pinnatifid and only 3-5jugate, 1.5–3 cm long, sessile or subsessile.

596. Lepidium ferganense Korsh.



Phytogeographical element: Brassicaceae, I-T Habitat: Steppes, thermophilous shrubs

Elevational range: 600 - 2100

Flowering period: V - VIII

Remarks: Cryptophyte; plant (25-)35-100(-110) cm high; uppermost cauline leaves shortly petiolate or sessile, glabrous; fruit wingless, carinate; seeds 1.5-2.2 mm.

597. Lepidium latifolium L.



Phytogeographical element: Plurireg

Habitat: River beds, riverside forests, loose sandy screes,

ruderal, fields, salt marshes Elevational range: 350 - 3950 Flowering period: V - IX

Remarks: Cryptophyte; plant stems 35–130(–150) cm high; leaf blade elliptic-ovate or oblong silicles pubescent.

Usefulness: Foo.

598. Lepidium paniculatum (Regel & Schmalh.) Al-Shehbaz

Synonyms: Stroganowia paniculata Regel & Schmalh.



Phytogeographical element: SE, I-T Habitat: Screes, steppes, forbs Elevational range: 1200 - 1900 Flowering period: V - VII

Remarks: Cryptophyte; plant 40-100 cm high; sepals

pinky, pubescent.

599. Lepidium perfoliatum L.



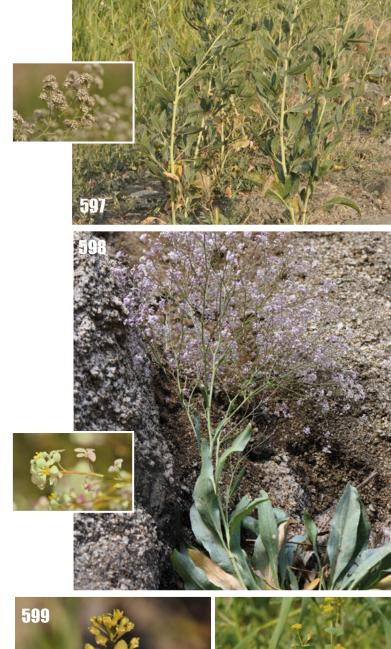
Phytogeographical element: I-T, M, E-S

Habitat: River beds, ruderal, fields, salt marshes

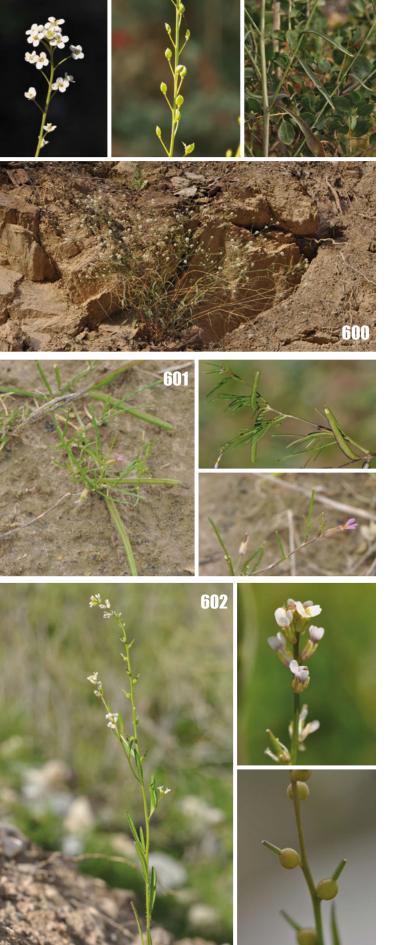
Elevational range: 350 - 900 Flowering period: III - V

Remarks: Therophyte; plant (7–)15–40(–65) cm high; basal and lowermost cauline leaves with petioles; upper cauline leaves sessile; upper leaves amplexicaul-perfoliate, basal leaves 2- or 3-pinnatisect; flowers yellow; seeds

winged all around. Usefulness: Med.







600. Lepidium seravschanicum Ovcz. & Junussov



Phytogeographical element: E, I-T

Habitat: Juniper forests, loose sandy screes, screes, forbs

Elevational range: 1600 - 2200 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 15–140 cm high; leaves pubescent, basal and lower stem leaves serrate only near

apex; involucres pubescent.

601. Leptaleum filifolium (Willd.) DC.

Synonyms: Sisymbrium filifolium Willd.



Phytogeographical element: I-T, M Habitat: Semi-deserts, steppes Elevational range: 300 - 4000 Flowering period: III - V

Remarks: Therophyte; plant (0.5-) 2-15(-20) cm high; leaf

lateral lobes filiform; fruit linear.

Usefulness: For.

602. Litwinowia tenuissima (Pall.) Woronow ex Pavlov

Synonyms: Euclidium tenuissimum (Pall.) B. Fedtsch., Vella tenuissima Pall.



Phytogeographical element: I-T, E-S

Habitat: Steppes, thermophilous shrubs, forbs

Elevational range: 500 - 3500 Flowering period: IV - VII

Remarks: Therophyte; plant (7-)15-40(-51) cm high;

siliques 2–3 mm with 2.5–4 mm long style.

Usefulness: For.

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603. Matthiola chorassanica Bunge ex Boiss.

Synonyms: Matthiola integrifolia Kom.



Phytogeographical element: E, I-T

Habitat: River beds, rocks, loose sandy screes, screes

Elevational range: 900 - 3000 Flowering period: VI - VIII

Remarks: Cryptophyte; plant (10–)15–45(–53) cm high; petals after flowering wrapping inside a flower; stigma

conically sharped.

604. Matthiola obovata Bunge

Synonyms: Matthiola runcinata Regel



Phytogeographical element: SE, I-T

Habitat: Semi-deserts, salt marshes, steppes

Elevational range: 450 - 2000 Flowering period: V - VIII

Remarks: Cryptophyte; plant 14-58 cm high; pubescent

with long, branched hairs, often glandular.

605. Megacarpaea gigantea Regel

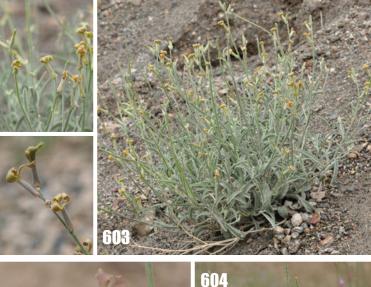


Phytogeographical element: SE, I-T Habitat: Screes, xeric shrubs, forbs Elevational range: 1000 - 3300 Flowering period: IV - VII

Remarks: Cryptophyte; plant 0.8–2 m high; stems glabrous; siliques segments 2, almost eliptical, arranged

with one another at an acute angle.

Usefulness: Med, Foo.

















606. Nasturtium microphyllum (Boenn. ex Rchb.) Rchb.

Synonyms: *Dictyosperma olgae* Regel ex Schmalh., *Pirea olgae* Regel & Schmalh.



Phytogeographical element: I-T, M, E-S

Habitat: River beds, fens and mires, littoral vegetation

Elevational range: 800 - 2900 Flowering period: V - VII

Remarks: Cryptophyte; plant 10–60 cm high; siliques

 $16-25 \times 1(-2)$ mm, with seeds in one row.

Usefulness: Med.

607. Neotorularia korolkowii (Regel & Schmalh.) Hedge & J. Léonard



Phytogeographical element: I-T Habitat: Semi-deserts, alpine steppes Elevational range: 1000 - 2800

Flowering period: V - IX

Remarks: Therophyte; plant 8–45 cm high covered with stalked, 1- or rarely 2-forked trichomes; basal leaves rosulate, oblong to lanceolate 1–6 cm 2–10 mm, margin entire, repand, or dentate; fruiting pedicels erect or ascending, 4–6 mm; sepals 2×1.5 mm; petals white, sometimes with yellowish center; fruit cylindric 1–3 cm \times 1 mm, mostly arcuate, pubescent with forked trichomes.

608. Neotorularia sulphurea (Korsh.) Ikonn.

Synonyms: *Torularia sulphurea* (Korsh.) O.E. Schulz, *Sisymbrium sulphureum* Korsh.



Phytogeographical element: EI-T

Habitat: Alpine semi-deserts, alpine steppes

Elevational range: 3600 - 4300 Flowering period: VI - IX

Remarks: Therophyte, hemicryptophyte; plant (1.5–)8–45(–60) cm high; fruiting pedicels narrower than fruit,

(3-)4-6(-8) mm; petals 5-7 mm.

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609. Neslia apiculata Fisch., C.A. Mey. & Avé-Lall.

Synonyms: Neslia paniculata (L.) Desv. subsp. thracica (Velen.) Bornm.



Phytogeographical element: I-T, M, E-S

Habitat: Fields

Elevational range: 700 - 3800 Flowering period: IV - VIII

Remarks: Therophyte; plant (14-)25-75(-90) cm high; petals

2–2.5 mm long, silicles 2–3 mm, seeds yellow.

Usefulness: For.

610. Pachypterygium brevipes Bunge



Phytogeographical element: I-T, M

Habitat: River beds, loose sandy screes, screes, fields

Elevational range: 1100 - 3000 Flowering period: VI - VII

Remarks: Therophyte; plant 15-42 cm high; silicles rigid violin-shaped, 4-6 mm long, together with peduncles directed

upwards, greenish.

611. Pachypterygium multicaule (Kar. & Kir.) Bunge

Synonyms: Pachypterygium densiflorum Bunge



Phytogeographical element: I-T Habitat: River beds, screes, steppes Elevational range: 1000 - 3400

Flowering period: IV - VII

Remarks: Therophyte; plant 8-25 cm high; inflorescence bent downwards at the top, silicles 2–4 mm long, elliptic.











612. Parrya asperrima (B. Fedtsch.) Popov

Synonyms: Neuroloma asperrimum (B. Fedtsch.) Botsch.



Phytogeographical element: Plurireg

Habitat: Rocks, screes
Elevational range: 2200 -

Elevational range: 2200 - 5500 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 10–25 cm high, cespitose, glandular throughout or eglandular, glabrous; basal leaves rosulate 2–12 cm, glabrous; leaf blade lanceolate, linear, spatulate, or oblong 3–11 cm × 4–10 mm, base cuneate; racemes 2–20-flowered; fruiting pedicels erect–ascending 2–7 cm; sepals linear 7–11 × 1.5–3 mm, glabrous or glandular; petals pink with yellowish center, broadly obovate, 1.6–2 cm × 6–10 mm; fruit linear to linear-lanceolate 4–7 cm × 4–7 mm.

613. Parrya darvasica Botsch. & Vved.

Synonyms: Achoriphragma darvazicum (Botsch. & Vved.) Soják, Neuroloma darvasicum (Botsch. & Vved.) Botsch.



Phytogeographical element: E, I-T

Habitat: Screes

Elevational range: 2000 - 2650 Flowering period: VI - VII

Remarks: Chamaephyte; plant a dwarf shrub up to 25 cm high; sparsely pubescent with simple hairs; leaves lanceolate, serrate; sepals pubescent at apex.

614. Parrya fruticulosa Regel & Schmalh.

Synonyms: Achoriphragma fruticulosum (Regel & Schmalh.) Soják, Neuroloma fruticulosum (Regel & Schmalh.) Botsch.



Phytogeographical element: E, I-T

Habitat: Juniper forests, alpine swards, alpine steppes,

xeric shrubs

Elevational range: 2200 - 2900 Flowering period: V - VII

Remarks: Chamaephyte; plant 14–40 cm high; annual stems glabrous or covered with long straight hairs; leaves

linnear, entire.

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615. Parrya pinnatifida Kar. et Kir.

Synonyms: Achoriphragma pinnatifidum (Kar. & Kir.) Sojak



Phytogeographical element: I-T

Habitat: Rocks

Elevational range: 2750 - 3700 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 8-20 cm high, glandular or eglandular, sparsely to densely pubescent with simple trichomes to 1.5 mm; fruit linear to linear-lanceolate, 3-8(-10) cm \times 2-2.5(-3) mm, valve margin flat, replum flattened, style 2.5-6 mm.

616. Parrya runcinata (Regel & Schmalh.) N. Busch

Synonyms: Achoriphragma runcinatum (Regel & Schmalh.) Soják



Phytogeographical element: E, I-T

Habitat: Screes, alpine steppes, moraines and snow-beds,

forbs

Elevational range: 2400 - 3600

Flowering period: VI - IX

Remarks: Chamaephyte; plant a dwarf shrub, 8–25 cm high; sparsely pubescent with simple hairs; leaves oblong

with pubescent petioles; sepals glabrous.

617. Parrya schugnana Lipsch.

Synonyms: Achoriphragma schugnanum (Lipsch.) Soják, Neuroloma schugnanum (Lipsch.) Botsch.



Phytogeographical element: E, EI-T Habitat: Rocks, screes, alpine steppes Elevational range: 2650 - 3900

Flowering period: VI - IX

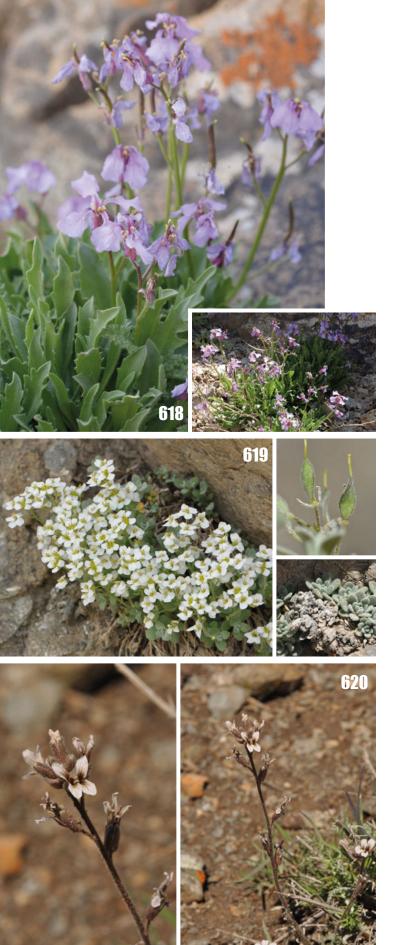
Remarks: Cryptophyte; plant (7–)10–26 cm high, covered with glandular hairs; leaves usually eliptic or obovate, dentate or sometimes entire; siliques 2–6 cm long,

3–5 mm wide; petals purple.









618. Parrya turkestanica (Korsh.) N. Busch.

Synonyms: Achoriphragma turkestanicum (Korsh.) Soják, Neuroloma turkestanicum (Korsh.) Botsch.



Phytogeographical element: E, I-T

Habitat: Rocks, loose sandy screes, screes, moraines and

snow-beds

Elevational range: 2700 - 4500 Flowering period: VI - IX

Remarks: Cryptophyte; plant (3–) 7–20(–27) cm high, covered with long glandular and straight hairs; siliques

1.8–6.5 cm long, 4–8 mm wide.

619. Phaeonychium surculosum Botsch.

Synonyms: Parrya surculosa N. Busch, Wakilia afghanica Gilli



Phytogeographical element: SE, EI-T

Habitat: Rocks

Elevational range: 3150 - 4000 Flowering period: VII - VIII

Remarks: Cryptophyte; branches of caudex densely covered

with remnants of dead leaves; petals 5–6 mm long,

3–3.5 mm wide, at the tip with no notch.

620. Pseudoclausia kuramensis Ovcz. & Junussov



Phytogeographical element: E, I-T

Habitat: Rocks, screes

Elevational range: 1800 - 2200

Flowering period: VI

Remarks: Hemicryptophyte; plant 15-33 cm high; stem

and siliques densely glandular.

Usefulness: For.

621. Pseudoclausia turkestanica (Lipsky) A.V. Vassil.

Synonyms: Clausia turkestanica Lipsky



Phytogeographical element: I-T Habitat: River beds, rocks, screes Elevational range: 1800 - 2200 Flowering period: V - VII

Remarks: Hemicryptophyte; plant (27–)40–70(–120) cm high; stem and siliques glabrous or almost glabrous; petals 12–21 mm long, emarginate at apex; peduncles of

siliques 7-20 mm, siliques 1.5-3 mm wide.

Usefulness: For.

622. Rapistrum rugosum (L.) All.

Synonyms: Myagrum rugosum L.



Phytogeographical element: I-T, M, E-S

Habitat: Ruderal, fields Elevational range: 750 - 1500 Flowering period: VI - VIII

Remarks: Therophyte; plant 41–82 cm high; peduncles apressed towards inflorescence axis; silicles 4–6 mm long (without horn) with a conical or awl-shaped horn

2-3.5 mm long.

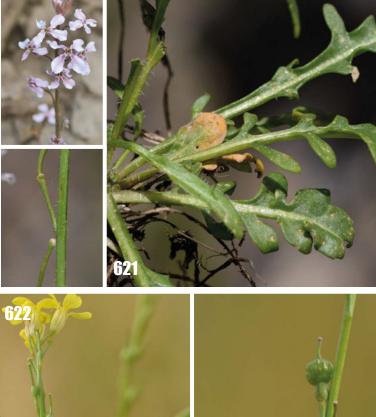
623. Sisymbrium altissimum L.



Phytogeographical element: Plurireg Habitat: Ruderal, fields, steppes Elevational range: 400 - 2500 Flowering period: IV - VII

Remarks: Therophyte, hemicryptophyte; plant 10–90 cm high; plant pubescent; sepals at flowering time bent aside.

Usefulness: For.

















624. Sisymbrium brassiciforme C.A. Mey.

Synonyms: Sisymbrium ferganense Korsh., S. iscandericum Kom.



Phytogeographical element: I-T, E-S

Habitat: River beds, loose sandy screes, screes, xeric

shrubs

Elevational range: 1500 - 4500 Flowering period: VI - IX

Remarks: Hemicryptophyte; plant 40-100(-125) cm high,

glabrous; siliques bent down.

625. Sisymbrium irio L.



Phytogeographical element: I-T, E-S, M

Habitat: Ruderal, fields Elevational range: 400 - 900 Flowering period: IV - V

Remarks: Therophyte, hemicryptophyte; plant 10–60 cm high; plant softly pubescent; petals 3-3.5 mm long.

626. Sisymbrium loeselii L.



Phytogeographical element: Plurireg

Habitat: Ruderal, fields Elevational range: 300 - 2800 Flowering period: IV - VI

Remarks: Therophyte, Hemicryptophyte; plant 20-125 cm high, stem in the lower part cover by rigid hairs; petals

5–7.5 mm long; legumes 1.5–4.6 cm long.

627. Sisymbrium subspinescens Bunge

Synonyms: Brassica subspinescens Fisch. & C.A. Mey.



Phytogeographical element: I-T Habitat: River beds, steppes Elevational range: 500 - 2000 Flowering period: IV - V

Remarks: Cryptophyte; plant 18-45 cm high; leaves obovate or oblong, fleshy; sepals 6-8 mm long; petals

11–13 mm long.

628. Smelowskia calycina (Stephan) C.A. Mey.

Synonyms: Hutchinsia pectinata Bunge, Lepidium calycinum Stephan



Phytogeographical element: I-T, E-S

Habitat: Alpine swards, screes, alpine steppes

Elevational range: 2500 - 4900 Flowering period: VI - IX

Remarks: Cryptophyte; plant (3.5-) 7-30(-40) cm high; fruit ovoid, pyriform, ellipsoid, oblong, or rarely linear-ellipsoid; seeds (or ovules) 4–10(–12) per fruit; fruiting pedicels suberect, ascending, or rarely divaricate;

inflorescence often simple.

629. Smelowskia sisymbrioides (Regel & Herder) Lipsky ex Paulsen

Synonyms: Hutchinsia sisymbrioides Regel & Herder, Sophiopsis sisymbrioides (Regel & Herder) O.E. Schulz



Phytogeographical element: I-T

Habitat: Juniper forests, rocks, alpine steppes

Elevational range: 2200 - 3600 Flowering period: VII - VIII

Remarks: Therophyte, hemicryptophyte; plant (7-)12-45(-55) cm high; fruiting pedicels divaricate, not appressed to rachis, glabrous or glabrescent; racemes ebracteate; stems erect or rarely ascending; uppermost leaves 2-pinnatisect;

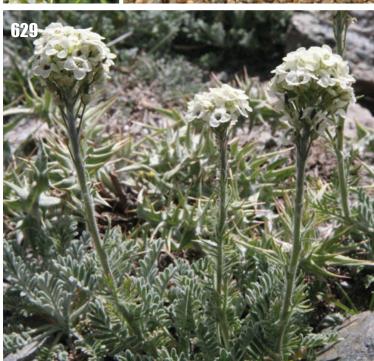
fruit slightly 4-angled; ovules 4-8 per ovary.





















630. Solms-laubachia flabellata (Regel) J.P. Yue, Al-Shehbaz & H. Sun

Synonyms: Ermania flabellata (Regel) O.E. Shulz, Oreoblastus flabellatus (Regel) Suslova, Parrya flabellata Regel



Phytogeographical element: I-T

Habitat: Rocks, alpine steppes, moraines and snow-beds

Elevational range: 3300 - 4800 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 4–15 cm high; racemes ebracteate; pedicels on a distinct rachis, not arising directly from a rossette; sepals free, narrowly oblong.

631. Strigosella africana (L.) Botsch.

Synonyms: Hesperis africana L.



Phytogeographical element: I-T, M

Habitat: River beds, loose sandy screes, screes, fields, salt

marshes

Elevational range: 350 - 4000 Flowering period: III - VII

Remarks: Therophyte; plant 10–60 cm high; petals ca. twice as long as the sepals, usually violet or pinkish; siliques usually 4–7 cm long, 1.5 mm broad, often pubescent with short and long mixed hairs (rarely hairs suppressed).

Usefulness: For.

632. Strigosella hispida (Litv.) Botsch.

Synonyms: Fedtschenkoa hispida (Litv.) Dvořák, Malcolmia hispida Litv.



Phytogeographical element: I-T Habitat: Deserts, fields Elevational range: 350 - 3800 Flowering period: V - VII

Remarks: Therophyte; plant (5–)10–30 cm high; densely hispid at least basally with exclusively simple subsetose trichomes to 3 mm; fruit strongly flattened straight.

Usefulness: For.

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633. Strigosella scorpioides (Bunge) Botsch.

Synonyms: Fedtschenkoa scorpioides (Bunge) Dvořák



Phytogeographical element: I-T Habitat: River beds, steppes Elevational range: 500 - 2200 Flowering period: IV - VI

Remarks: Therophyte; plant (5–)8–30(–35) cm high, covered mostly with thick forked protruding hairs, sometimes with admixture of other hair types; sepals 2.5–3.5(–4) mm long; petals (5–)6–9 mm long; siliques cylindrical, 3–6 cm long, ca. 1 mm wide, covered with forked and thick straight hairs, twisted at the tip.

634. Strigosella stenopetala (Bernh. ex Fisch. & C.A. Mey.) Botsch.

Synonyms: Fedtschenkoa stenopetala (Bernh.) Dvořák, Malcolmia stenopetala Bernh. ex Ledeb.



Phytogeographical element: I-T, E-S

Habitat: Riverside forests, salt shrubs, salt marshes

Elevational range: 350 - 800 Flowering period: III - VIII

Remarks: Therophyte; plant (4.5–)15–30(–45) cm high, sparsely to densely pubescent with short–stalked, forked or subdendritic trichomes sometimes mixed with simple subsetose ones, rarely glabrescent; fruit quadrangular, not torulose, straight.

635. Strigosella tenuissima (Botsch.) Botsch.



Phytogeographical element: I-T

Habitat: Meadows, semi-deserts, salt marshes, steppes, forbs

Elevational range: 400 - 800 Flowering period: III - V

Remarks: Therophyte; plant (6–) 10–35(–45) cm high, covered with 2–3-branched hairs, stems in an upper part sometimes glabrous; sepals 3.5–4 mm long; petals 7–11 mm long; siliques 2.8–6.5 cm long, 0.6 mm wide, entire or partly covered with straight and 2-branched hairs.

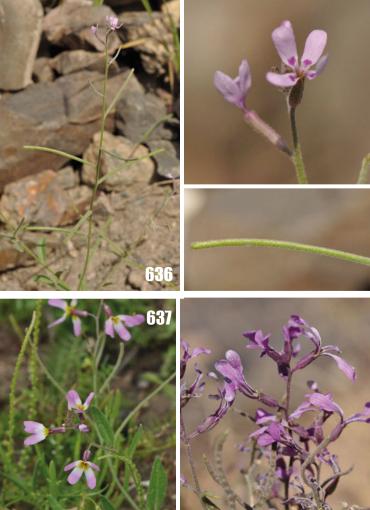
















636. Strigosella trichocarpa (Boiss. & Buhse) Botsch.

Synonyms: Malcolmia africana (L.) R. Br. var. trichocarpa (Boiss. & Buhse) Boiss., M. trichocarpa Boiss. & Buhse



Phytogeographical element: I-T

Habitat: Juniper forests, meadows, fields, steppes, xeric

shrubs, thermophilous shrubs Elevational range: 400 - 2600 Flowering period: III - VIII

Remarks: Therophyte; plant 10–60 cm high; stem usually densely covered with 2-branched hairs; leaves covered with 2–3-branched hairs; sepals 4.5–5.5(–6) mm long; petals 8–10 mm long; siliques 3–8 cm long, 1.3 mm wide.

637. Strigosella turkestanica (Litv.) Botsch.



Phytogeographical element: I-T

Habitat: Juniper forests, fields, steppes, thermophilous

shrubs

Elevational range: 500 - 1700 Flowering period: III - VII

Remarks: Therophyte; plant (5–)10–40(–50) cm high; lower leaves usually entire; sepals (2–)2.5–3.5(–5) cm long; petals 1–1.5 cm long; siliques 3–4.5 cm long.

Usefulness: For.

638. Stubendorffia aptera Lipsky



Phytogeographical element: E, I-T

Habitat: Juniper forests, broad-leaved forests, xeric shrubs,

forbs

Elevational range: 1100 - 2800 Flowering period: V - VII

Remarks: Cryptophyte; plant 16–35 cm high; sepals glabrous; peduncles pubecent; silicles swollen-like,

obcordate to reversed wedge shaped.

Usefulness: For.

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639. Stubendorffia orientalis Schrenk



Phytogeographical element: I-T

Habitat: Juniper forests, broad-leaved forests, xeric shrubs,

forbs

Elevational range: 1400 - 1600 Flowering period: V - VII

Remarks: Cryptophyte; plant 50–150 cm high; sepals pubescent; peduncles glabrous; silicles not swollen-like,

obovate to roundish. Usefulness: Foo.

640. Tauscheria lasiocarpa Fisch. ex DC.

Synonyms: Tauscheria oblonga Vassilcz.



Phytogeographical element: I-T Habitat: Screes, fields, steppes Elevational range: 400 - 3800 Flowering period: IV - V

Remarks: Therophyte; plant 10-60 cm high; siliques canoe-

shaped with pectinate edge.

Usefulness: For.

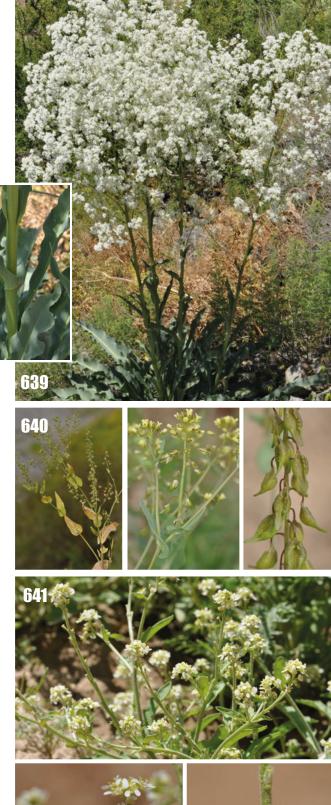
641. Tetracme bucharica O.E. Schulz

Synonyms: Tetracmidion bucharicum Korsch.



Phytogeographical element: I-T Habitat: Salt marshes, steppes Elevational range: 400 - 900 Flowering period: IV - V

Remarks: Therophyte; plant (5–)14–37 cm high; horns of silicles oriented straight upwards or slightly diverging.





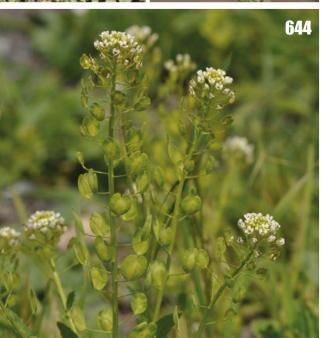












642. Tetracme pamirica Vassilcz.

Synonyms: Tetracme adpressa Rech. f.



Phytogeographical element: I-T

Habitat: Rocks, screes

Elevational range: 1900 - 3900 Flowering period: VI - VIII

Remarks: Therophyte; plant (4–) 10–30(–50) cm high; siliques 10–14 mm long, flattened, adjacent to stem.

Usefulness: For.

643. Tetracme quadricornis (Steph. ex Willd.) Bunge

Synonyms: Erysimum quadricorne Stephan ex Willd.



Phytogeographical element: I-T Habitat: Screes, deserts Elevational range: 400 - 3800 Flowering period: V - VIII

Remarks: Therophyte; plant (3–)5–20(–25) cm high; siliques 5–8 mm long, 4-angled, adjacent to stem only at

base.

Usefulness: For.

644. Thlaspi arvense L.



Phytogeographical element: Plurireg

Habitat: Pastures, fields Elevational range: 350 - 3800 Flowering period: III - X

Remarks: Therophyte; plant 15–70 cm high; leaves $2-10 \times$

0.5–3 cm, dentate. Usefulness: Med, For.

645. Thlaspi ceratocarpum N. Busch

Synonyms: Carpoceras ceratocarpum (Pall.) N. Busch, Lepidium ceratocarpum Pall.



Phytogeographical element: I-T, E-S

Habitat: Fields

Elevational range: 2800 - 2850 Flowering period: VII - VIII

Remarks: Therophyte; plant 8–30 cm high; silicles triangular flattened with 2 sharp-pointed diverging

ciriform horns.

646. Thlaspi cochleariforme DC.

Synonyms: Noccaea cochleariformis (DC.) A. Löve & D. Löve



Phytogeographical element: I-T, E-S Habitat: Juniper forests, forbs Elevational range: 1900 - 3500 Flowering period: V - VII

Remarks: Cryptophyte; plant (5–)8–25 (–45) cm high; silicles reversed lanceolate to wedge-shaped with a narrow

keel.

647. Thlaspi kotschyanum Boiss. & Hohen.

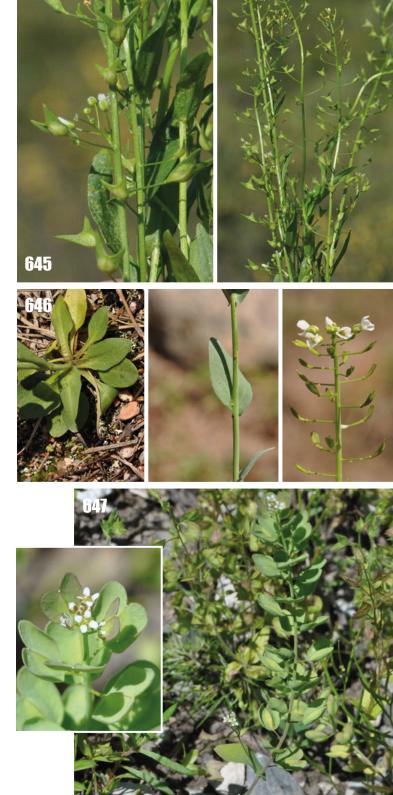
Synonyms: Neurotropis kotschyana (Boiss. & Hohen.) Czerep.



Phytogeographical element: I-T, E-S Habitat: Screes, meadows Elevational range: 1800 - 3100 Flowering period: V - VII

Remarks: Therophyte; plant 10-35 cm high; silicles widely

obovate, 6–10 mm long, 6–12 mm wide.























648. Thlaspi perfoliatum L.

Synonyms: Microthlaspi perfoliatum (L.) F.K. Mey.



Phytogeographical element: I-T, M, E-S

Habitat: Juniper forests, screes, xeric shrubs, forbs

Elevational range: 450 - 2400 Flowering period: II - VI

Remarks: Therophyte; plant 8-30 cm high; silicles widely

obovate, 5-6.5 mm long, 4-6 mm wide.

Usefulness: For.

649. Winklera silaifolia Korsh.

Synonyms: Heldreichia silaifolia Hook. f. & Thoms., Uranodactylus silaifolius Gilli



Phytogeographical element: I-T

Habitat: Screes, forbs

Elevational range: 2800 - 4300 Flowering period: VI - VIII

Remarks: Cryptophyte; plant stem 10-50 cm high; silicles

wrinkled tuberous.

650. Butomus umbellatus L.



Phytogeographical element: I-T, E-S, Orient, M

Habitat: Littoral vegetation Elevational range: 350 - 1050 Flowering period: VI - VII

Remarks: Cryptophyte; plant 40–120 cm high; flowers pink

or whitish with pedicels 4-8 cm long.

651. Adenophora himalayana Feer



Phytogeographical element: EI-T, Himal Habitat: Alpine meadows, alpine swards

Elevational range: 3000 - 4500 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 20–60 cm high; leaves usually broadly linear; calyx lobes entire, very occasionally with verrucose denticles on margins; disk 2–3 mm in (diam.);

style usually slightly exserted.

652. Asyneuma argutum (Regel) Bornm.



Phytogeographical element: SE, I-T

Habitat: Forbs

Elevational range: 1100 - 3200 Flowering period: V - VII

Remarks: Cryptophyte; plant 40–100 cm high; calyx bell-shaped; corolla blue or azure; flower bracts 3–8 mm long.

653. Campanula eugeniae Fed.



Phytogeographical element: I-T Habitat: Rocks Elevational range: 800 - 2000

Flowering period: V - VI Remarks: Cryptophyte; plant 10–15 cm high; leaves with

petioles 1.5–2 times longer than blades; calyx and corolla

glabrous.











654. Campanula glomerata L.



Phytogeographical element: I-T, E-S Habitat: Riverside forests, forbs Elevational range: 400 - 3600 Flowering period: V - VII

Remarks: Cryptophyte; plant 20–100 cm high; basal leaves long petiolate; blade ovate-lanceolate or ovate, 6–15 × 2–7 cm, base cordate, margin serrulate, apex acute; cauline leaf blade elliptic; corolla blue–purple or blue, tubular-campanulate, 1.5–2.5 cm; lobes equaling tube.

Usefulness: Med.

655. Campanula incanescens Boiss.

Synonyms: Campanula fedtschenkiana Trautv.



Phytogeographical element: I-T

Habitat: Rocks

Elevational range: 400 - 3600 Flowering period: VI - VIII

Remarks: Cryptophyte; plants up to 30 cm high; stems pubescent; leaves numerous, subsessile to shortly petiolate lanceolate to oval, hoary pubescent, 5 mm to 3 cm long, margin entire to widely dentate; inflorescence in lax corymbs; corolla pale violet to blue, up to 2 cm

long.

656. Campanula lehmanniana Bunge

Synonyms: Campanula lehmanniana subsp. integerrima R. Kam.



Phytogeographical element: E, I-T

Habitat: Rocks

Elevational range: 400 - 2000 Flowering period: VI - VII

Remarks: Cryptophyte; plant 5-15 cm high, calyx and

corolla minutely hairy.

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657. Campanula capusii (Franch.) Fed.

Synonyms: Campanula lehmanniana Bunge subsp. capusii (Franch.) Victorov



Phytogeographical element: I-T

Habitat: Rocks

Elevational range: 1600 - 3100 Flowering period: V - VIII

Remarks: Cryptophyte; plant 5-15 cm high, calyx and

corolla glabrous.

658. Campanula stevenii M. Bieb. subsp. alberti (Trautv.) Victorov

Synonyms: Campanula alberti Trautv.



Phytogeographical element: I-T

Habitat: Rocks

Elevational range: 500 - 1900 Flowering period: V - VII

Remarks: Cryptophyte; plants 20–50 cm tall; middle cauline leaves longer than 2 cm; calyx lobes 5–9 mm;

corolla 15-20 mm, violet.

659. Codonopsis clematidea (Schrenk) C.B. Clarke

Synonyms: *Glosocomia clematidea* (Schrenk ex Fisch. & C.A. Mey.) Fisch. ex Regel, *Wahlenbergia clematidea* Schrenk

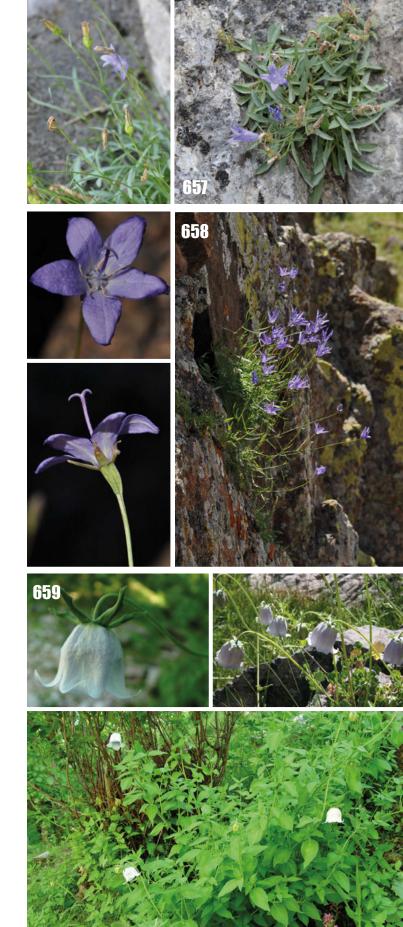


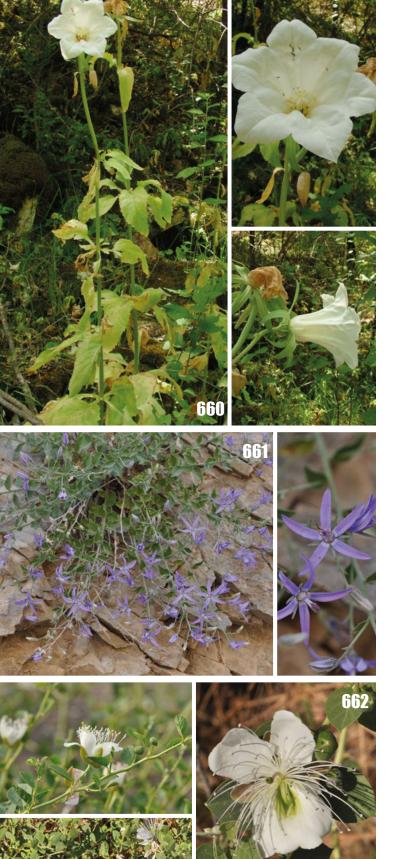
Phytogeographical element: I-T Habitat: Forbs, springs Elevational range: 400 - 3500 Flowering period: VI - VIII

Remarks: Cryptophyte; plants with unpleasant smell, 1 m or more tall or decumbent; leaves ovate-lanceolate; calyx segments broad, triangular, overlapping at base, sinus

acute.

Usefulness: Med.





660. Ostrowskia magnifica Regel



Phytogeographical element: I-T

Habitat: Broad-leaved forests, riverside forests

Elevational range: 1200 - 2300 Flowering period: VI - VII

Remarks: Cryptophyte; plant up to 150 cm high; stem erect; leaves 10–21 cm; corolla 7–8 cm, blue or white.

Usefulness: Orn.

661. Sergia regelii (Trautv.) Fed.

Synonyms: Asyneuma regelii (Trautv.) Bornm., Phyteuma regelii Trautv.



Phytogeographical element: E, I-T

Habitat: Rocks

Elevational range: 1450 - 2820 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 10-30 cm high; corolla

covered by bristle-hairs.

662. Capparis herbacea Willd.

Synonyms: Capparis sicula Duhamel subsp. herbacea (Willd.) Inocencio, D. Rivera, Obón & Alcaraz



Phytogeographical element: I-T, M

Habitat: River beds, loose sandy screes, screes

Elevational range: 400 - 2400 Flowering period: V - VI

Remarks: Cryptophyte; plant perennial, 1–2 m high; leaves

ovate, flowers 5–8 cm in diameter.

Usefulness: Med, For, Foo.

663. Capparis rosanowiana B. Fedtsch.

Synonyms: Capparis mucronifolia Boiss. subsp. rosanoviana (B. Fedtsch.) Inocencio, D. Rivera, Obón & Alcaraz



Phytogeographical element: E, I-T

Habitat: Rocks, screes, steppes, thermophilous shrubs

Elevational range: 500 - 1600 Flowering period: V - VI

Remarks: Cryptophyte; plant 35–50 cm high; leaves linear-lanceolate; flowers 1.5–2 cm in diameter; fruit 1.5–2 cm

long.

664. Cephalaria syriaca (L.) Schrad. ex Roem. & Schult.



Phytogeographical element: I-T Habitat: Ruderal, fields, steppes Elevational range: 700 - 2000 Flowering period: V - VI

Remarks: Therophyte; plant up to 1 m high; bracts glume-

like.

665. Dipsacus dipsacoides (Kar. & Kir.) V.I. Botsch.

Synonyms: Cephalaria dipsacoides Kar. & Kir., Dipsacus azureus Schrenk



Phytogeographical element: I-T

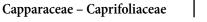
Habitat: River beds, broad-leaved forests, screes, xeric

shrubs, forbs

Elevational range: 1500 - 3000 Flowering period: VIII - IX

Remarks: Hemicryptophyte; plant 50–130 cm high; leaves

not connate at base; corolla blue or pink-violet.



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666. Dipsacus laciniatus L.



Phytogeographical element: I-T, E-S, M Habitat: Ruderal, fields, littoral vegetation

Elevational range: 600 - 1700 Flowering period: VII - VIII

Remarks: Hemicryptophyte; plant 1–2.5 m high; upper cauline leaves connate at base, laciniate or pinnatifid.

667. Lomelosia olivieri (Coult.) Greuter & Burdet

Synonyms: Scabiosa olivieri Coult.



Phytogeographical element: I-T, E-S

Habitat: Fields, steppes, thermophilous shrubs

Elevational range: 500 - 2500 Flowering period: V - VII

Remarks: Therophyte; plant 3-40 cm high; involucres

3–8 mm long, not ciliate at the edge.

668. Lonicera korolkowii Stapf



Phytogeographical element: I-T

Habitat: River beds, broad-leaved forests, riverside forests

Elevational range: 650 - 3700 Flowering period: V - VI

Remarks: Nanophanerophyte; shrub, 3-4 m high; flower

peduncles 1–3 cm. Usefulness: Orn.

669. Lonicera microphylla Willd. ex Schult.



Phytogeographical element: I-T Habitat: River beds, rocks, screes Elevational range: 2400 - 3000 Flowering period: V - VII

Remarks: Nanophanerophyte; shrub up to 2 m high; bracteoles obsolete or minute; calyx lobes obsolete,

margin undulate; berries connate, red.

Usefulness: Orn.

670. Lonicera olgae Regel & Schmalh.



Phytogeographical element: I-T

Habitat: Screes, steppes, xeric shrubs, forbs

Elevational range: 1700 - 4200 Flowering period: VI - VII

Remarks: Nanophanerophyte; Small shrub 50(-80) cm high; often procumbent (and then up to 20 cm high); leaves entire $1-2\times0.8-1.5$ cm, ovate or elliptical, glabrous or sparcely hispid; peduncles present at the axils of middle and lower pairs of leaves; corolla yellow; bracteoles not fused with ovary; berries orange.

Usefulness: Orn.

671. Lonicera semenovii Regel



Phytogeographical element: EI-T

Habitat: Rocks, screes

Elevational range: 3400 - 4800

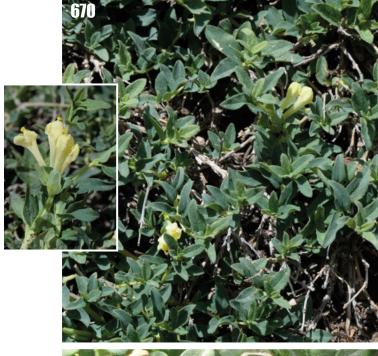
Flowering period: VII

Remarks: Nanophanerophyte; Dwarf shrub 10(–20) cm high, sometimes cushionlike; young shoots glabrous or sparcely pubescent; leaf blade 0.5–1.5 cm long, narrowly elliptical to lanceolate; bracts 0.7–1 cm long, ovate to nearly rounded; fused only at the base; corolla 1.5–2.5 cm long, glabrous on the outer side, yellow; berries orange-

red.

Usefulness: Orn.









672. Lonicera spinosa (Decne.) Jacq. ex Walp.

Synonyms: Lonicera alberti Regel



Phytogeographical element: EI-T

Habitat: River beds

Elevational range: 2600 - 2800 Flowering period: VI - VII

Remarks: Nanophanerophyte; shrub 1(–1.2) m high; leaves linear, entire or only little incised; peduncles present in leaves' axils at the middle and lower, or only the lower part of a shrub; all four bracteoles fused with cup-like involucrum, surrounding lower part of ovary; berries 0.5–0.8 cm in diameter, spherical, white with a reddish tint, becoming black when dry.

Usefulness: Orn.

673. Lonicera stenantha Pojark.



Phytogeographical element: I-T

Habitat: River beds, juniper forests, riverside forests, xeric

shrubs

Elevational range: 2200 - 3700 Flowering period: V - VI

Remarks: Nanophanerophyte; shrub up to 2.5 m high; leaves more than 2 cm long; bracts linear, bracteoles connate; corolla yellow; berries blue, on short peduncle up

to 10 mm long. Usefulness: Orn.

674. Lonicera zaravschanica Pojark.



Phytogeographical element: I-T

Habitat: River beds, riverside forests, screes, forbs

Elevational range: 1500 - 3800 Flowering period: VI - VII

Remarks: Nanophanerophyte; shrub 1 (–1.5) m high, or procumbent up to 30 cm high; young shoots grey; leaves broadly ovate or nearly rounded, 1–2.5 cm long, at basal part covered with short, protruding trichomes with admixture of longer hispid trichomes and pedunculate glandular trichomes; peduncles present only in the axiles

of lower pairs of leaves; corolla yellow, pubescent on the outer side; bracts lanceolate, up to 1 cm long, not fused, densely hispid with admixture of gladular trichomes; bracteoles not fused with ovary; berries up to 0.7 cm long, pinkish-red.

Úsefulness: Orn.

675. Morina coulteriana Royle



Phytogeographical element: , I-T Habitat: Juniper forests, forbs Elevational range: 2000 - 3800 Flowering period: VII - IX

Remarks: Cryptophyte; plant up to 75 cm high; crown up

to 3.5 cm, calyx up to 2 cm.

676. Morina persica L.



Phytogeographical element: I-T, M

Habitat: Screes, forbs

Elevational range: 1800 - 3100

Flowering period: VII

Remarks: Cryptophyte; plant 50-70 cm high; leaves

aristate.

677. Pterocephalus afghanicus Boiss.

Synonyms: Pterocephalus sarawschanicus Lipsky, Scabiosa afghanica Aitch. & Hemsl.



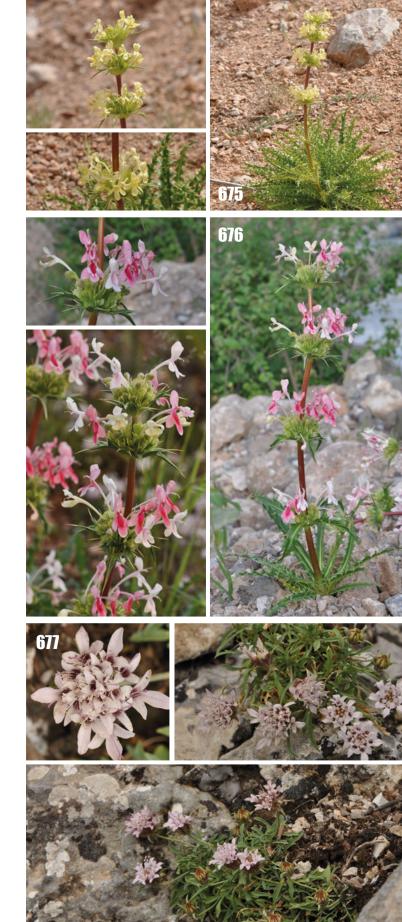
Phytogeographical element: I-T

Habitat: Rocks

Elevational range: 1000 - 3100 Flowering period: VI - VII

Remarks: Cryptophyte; plant 10–15 cm high; with multiple stems; leaves 1.5–3.5 cm long, 3–7 mm wide, sessile, glabrous (or nearly glabrous); peduncles 2–4 cm long, densely strigose; inflorescence a head, ca. 3 cm in

diameter; bracts bristle-like.







678. Scabiosa alpestris Kar. & Kir.



Phytogeographical element: I-T Habitat: Steppes, forbs Elevational range: 2800 - 3200 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 30-35 cm high; stem usually single (sometimes several), hispid, with 2–3(4) internodes; leaves 4-20 cm long, 0.5-1.5 cm wide; peduncles 8-12 cm long, tomentose; head 5-6 cm in diameter; achene "crown" with sinuate margin (not toothed).

679. Scabiosa songarica Schrenk



Phytogeographical element: I-T

Habitat: Loose sandy screes, screes, steppes,

thermophilous shrubs, forbs Elevational range: 1000 - 3000 Flowering period: V - VIII

Remarks: Cryptophyte; plant (20–)35–80(–100) cm high; several stems, with 4-7 internodes, densely hispid; leaves 10–30 cm long, 2–3 cm wide; peduncles 10–30 cm long, hispid; head 2.5-5.5 cm in diamater; "crown" of achene with toothed margin.

680. Valeriana fedtschenkoi Coincy



Phytogeographical element: I-T

Habitat: Alpine meadows, alpine steppes, xeric shrubs

Elevational range: 2800 - 4200

Flowering period: VIII

Remarks: Cryptophyte; plant 10-40 cm high; basal leaves with long petioles; terminal leaf blade lobe of cauline leaves large, ovate or lanceolate; inflorescence a compoung cyme consisting of dense, spherical clusters; corolla pink, 4-6 mm long; usually 3 stamens (rarely 4); seeds with pappus.

Usefulness: Med, For.

681. Valeriana ficariifolia Boiss.



Phytogeographical element: I-T

Habitat: Steppes, thermophilous shrubs

Elevational range: 650 - 3400 Flowering period: IV - V

Remarks: Cryptophyte; plant 10–75 cm high; rhizomes reduced; roots fascicled; stem singular, thick, fistulose, sulcate, shining; basal leaves with long petiole (3–9 cm); blade broadly ovate or cordate; lower cauline leaves in 2 or 3 pairs; petiole 2–4 cm, clasping and sheathing; blade lyrate; terminal lobe orbicular to broadly elliptic; lateral lobes 2- or 3-paired, remote, broadly ovate, smaller toward base; corolla white; seeds greyish without yellows spots; pappus with 10–13 trichomes.

Usefulness: Med, Foo.

682. Valeriana minuta Wendelbo



Phytogeographical element: I-T Habitat: Screes, alpine steppes Elevational range: 3300 - 4300 Flowering period: VI - VII

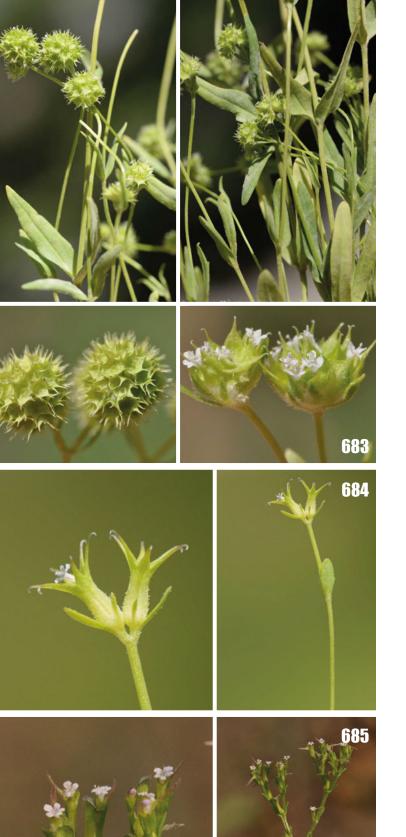
Remarks: Cryptophyte; plant 4–9 cm high; basal leaves ovate, with very short petioles or sessile, leaf blade 7–10 mm long, 5–9 mm wide; terminal leaflets of cauline leaves small and elongated; inflorescence a compound cyme consisting of dense, spherical clusters; corolla

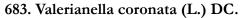
bluish, 5-8 mm long.











Synonyms: Valeriana locusta (L.) Laterr. var. coronata L.



Phytogeographical element: Plurireg

Habitat: Steppes, forbs Elevational range: 700 - 1700 Flowering period: IV - V

Remarks: Therophyte; plant 6–18 cm high; leaves linear to lanceolate, 20–30 × 2–4 mm, upper often pinnatifid, margin sparsely pubescent; bracts 3–4 mm long, margin white, ciliate; flowers in dense globose clusters; corolla pubescent; calyx 6-lobed; lobes triangular, uncinate;

achene 3–5 mm long, ovate. Usefulness: For, Foo.

684. Valerianella dactylophylla Boiss. & Hohen.



Phytogeographical element: I-T

Habitat: Steppes, thermophilous shrubs, forbs

Elevational range: 1200 - 2550

Flowering period: V

Remarks: Therophyte; plant 15–40 cm high; bracts pubescent; corolla glabrous; calyx 6–7 lobed, lobes with hooked, 2–3 mm long teeth at the apices; seeds elongated, densely papillous, with 2 tubercles at the base.

685. Valerianella oxyrhyncha Fisch. & C.A. Mey.



Phytogeographical element: I-T Habitat: Screes, steppes Elevational range: 1000 - 2750

Flowering period: IV - V

Remarks: Therophyte; plant 5–23 cm high; stems sparsely pubescent; leaves 1.5–4 cm × 4–8 mm, lanceolate to linear; inflorescence loose; bracts triangular or elongated, pubescent; corolla glabrous; calyx much broader and shorter than seed, with 3 asymmetrical lobes or with 1 long, subulate, curved tooth 3–4 mm long; seeds pubescent, elongated, easily separating from each other.

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686. Acanthophyllum albidum Schischk.



Phytogeographical element: E, I-T Habitat: River beds, semi-deserts, steppes

Elevational range: 800 - 1600 Flowering period: V - VI

Remarks: Chamaephyte; plant 10–25 cm high; leaves $15-30 \times 1-1.5$ mm; calyx 6–7 mm long; petals white,

rarely pinkish.

687. Acanthophyllum glandulosum Bunge ex Boiss.



Phytogeographical element: I-T Habitat: Loose sandy screes, screes Elevational range: 2500 - 3700 Flowering period: VII - VIII

Remarks: Chamaephyte; plant 8–15 cm high; leaves 12–25 (–40) × 1 mm; calyx 7–8 mm long; ovary with 8–12 seeds;

petals white with pink veins.

688. Acanthophyllum pulchrum Schischk.



Phytogeographical element: E, I-T

Habitat: Loose sandy screes, screes, steppes

Elevational range: 1400 - 1900 Flowering period: V - VI

Remarks: Cryptophyte; plant 15–20 cm high; leaves 7–11 $(-16) \times 0.5$ –0.7 mm, flat; calyx 9–10 mm long.

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689. Acanthophyllum pungens (Bunge) Boiss.



Phytogeographical element: I-T Habitat: Loose sandy screes, screes Elevational range: 500 - 2500 Flowering period: V - VII

Remarks: Cryptophyte; plant 15–30 cm high; leaves 15–30 × 1–1.5 mm, villous; calyx 8–9 mm long; ovary with 4

seeds; petals pink. Usefulness: Med.

690. Acanthophyllum sarawschanicum Golenkin



Phytogeographical element: E, I-T

Habitat: Screes, steppes Elevational range: 1800 - 2500

Flowering period: VII

Remarks: Chamaephyte; plant 15–30 cm high; leaves (1–)1.5–2 mm wide, flat, linear; taxon similar to *A. elatius*,

which has wider leaves (3-12 mm).

691. Allochrusa paniculata (Regel & Herder) Ovcz. & Czukav.

Synonyms: Acanthophyllum paniculatum Regel



Phytogeographical element: I-T Habitat: Loose sandy screes, screes Elevational range: 550 - 1000 Flowering period: VI - VII

Remarks: Cryptophyte; plant 25–50 cm high; stem pale green, short and roughly pubescent; calyx 3.8–4.1 mm

long.

692. Arenaria bungei Barkoudah

Synonyms: Gypsophila alsinoides Bunge



Phytogeographical element: I-T Habitat: Steppes, screes Elevational range: 1400 - 2700 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 10-25 mm high with divaricate branching; leaves few, $10-25 \times 2-4$ mm, linear-lanceolate, acute; flowers in compound dichasial cymes; calyx 2-3 mm, glabrous, lobed almost to the base, 3-nerved; petals slightly longer than calyx, deeply divided into linear lobes; capsule globose, as long as calyx.

693. Arenaria serpyllifolia L.



Phytogeographical element: Plurireg Habitat: Juniper forests, fields, steppes

Elevational range: 400 - 3500 Flowering period: IV - V

Remarks: Therophyte, hemicryptophyte; plant 10-30 cm high; leaf blade ovate, $4-12\times 3-7$ mm; seeds tuberculate with raised papillae; petals usually slightly shorter than sepals.

Usefulness: For.

694. Pseudosaponaria pilosa (Huds.) Ikonn

Synonyms: Gypsophila fedtschenkoana Schischk.



Phytogeographical element: SE, I-T

Habitat: Juniper forests, loose sandy screes, screes, forbs

Elevational range: 950 - 1900 Flowering period: IV - VI

Remarks: Cryptophyte; plant 40–80 cm high; leaves glabrous, rarely with ciliate edges; calyx and stem with

glandular hairs, calyx 5–7 mm long.



















695. Cerastium dichotomum L.



Phytogeographical element: M, I-T Habitat: Steppes, meadows Elevational range: 500 - 1900 Flowering period: III - V

Remarks: Therophyte; plant 10–15 cm high with dichotomous or divaricate branching; styles 3, sepals 8–12 mm; calyx somewhat inflated in fruit; capsule

dehiscing by 6 flat teeth.

696. Cerastium dichotomum L. subsp. inflatum Cullen

Synonyms: Cerastium inflatum Gren.



Phytogeographical element: I-T Habitat: Screes, steppes, forbs Elevational range: 800 - 2500 Flowering period: IV - V

Remarks: Therophyte; plant 5–20 cm high; 5 styles; capsule with 10 teeth; calyx at fruiting time swollen.

697. Cerastium perfoliatum L.



Phytogeographical element: I-T, E-S, M

Habitat: River beds Elevational range: 700 - 900

Flowering period: IV - V

Remarks: Cryptophyte; plant 7–40 cm high, entirely glabrous; petals slightly shorter than calyx; capsule teeth

revolute. Usefulness: For.

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698. Cerastium pumilum Curtis

Synonyms: Cerastium dentatum Moschl.



Phytogeographical element: Plurireg Habitat: Steppes, dry meadows Elevational range: 800 - 1900 Flowering period: III - V

Remarks: Therophyte; plant up to 10 cm high; petals lanceolate, hairy, shorter or equally long as the sepals; bracts broadly lanceolate-oblong, viscid, covered with short, dense, glandular and eglandular hairs; sepals and distal bracts with narrow membranaceus margins; petal veins not branched.

699. Cerastium tianschanicum Schischk.



Phytogeographical element: I-T Habitat: Fens and mires, springs Elevational range: 2400 - 4100 Flowering period: VI - VII

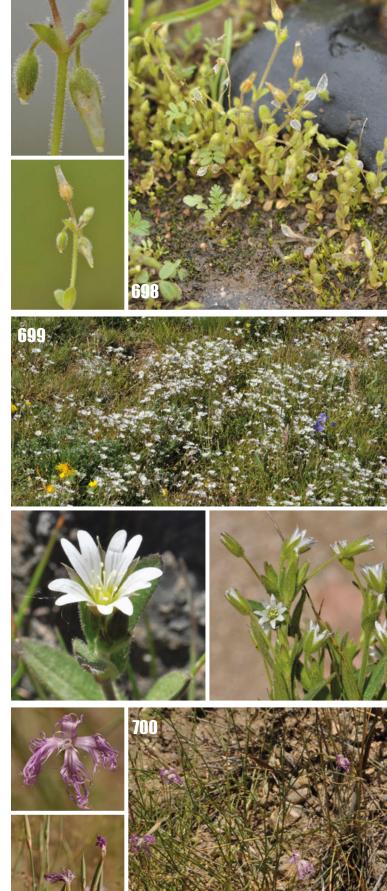
Remarks: Cryptophyte; plant 10–30 cm high; leaves lanceolate, pubescent; 5 styles; capsule with 10 teeth; sepals 6–8 mm.

700. Dianthus baldshuanicus Lincz.



Phytogeographical element: E, I-T Habitat: Loose sandy screes, screes Elevational range: 930 - 3020 Flowering period: VI - VII

Remarks: Cryptophyte; plant (25–) 35–45 cm high; leaves 5–9 cm long and 2.5–3 mm wide; calyx 25–28(–35) mm.





701. Dianthus crinitus Sm. subsp. tetralepis (Nevski) Rech. f.

Synonyms: Dianthus tetralepis Nevski



Phytogeographical element: SE, I-T Habitat: River beds, screes Elevational range: 600 - 2800 Flowering period: V - VII

Remarks: Cryptophyte; plant up to 40 cm high; flowers solitary; calyx 25–28(–35) mm; leaves 5–9 cm × 2.5–5 mm; bracteoles ovoid or prolonge–laneolate, acute with

appendage 1–2 mm.

702. Dianthus darvazicus Lincz.



Phytogeographical element: SE, I-T

Habitat: Rocks, screes

Elevational range: 2300 - 3350 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 20–25(–30) cm high; calyx

16-22 mm long.

703. Dianthus hoeltzeri C. Winkl.



Phytogeographical element: EI-T

Habitat: Steppes

Elevational range: 1500 - 3300 Flowering period: VI - VII

Remarks: Cryptophyte; plant up to 60 cm high; leaves linear-lanceolate, 4–6 cm \times 2–4 mm, apex sharply pointed; flowers 1–4; bracts 4, broadly ovate, 1/4–1/3 as long as calyx; calyx reddish purple, cylindric, ca. 2.4 cm; petals deep rose, 2.5–3 \times as long as calyx. This species is sometimes regarded as a synonym of Dianthus superbus L.

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704. Dianthus kuschakewiczii Regel & Schmalh.



Phytogeographical element: EI-T Habitat: Steppes, screes Elevational range: 1600 - 3500 Flowering period: VI - VIII

Remarks: Cryptophyte; plant up to 35 cm high; stems numerous, branched, glabrous; leaves linear 2–8 cm \times 0.5–2 mm; flower solitary, bracts 4, oblong to elliptic, 1/3–1/2 as long as calyx, leathery; calyx cylindric, 2.5–3.5 cm \times 3–4 mm; petals white, rarely pale rose.

705. Dichodon cerastioides (L.) Rchb.

Synonyms: Cerastium cerastoides (L.) Britton



Phytogeographical element: Plurireg

Habitat: Fens and mires, rocks, screes, alpine steppes

Elevational range: 2800 - 4500 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 5–20 cm high; leaves linear-

lanceolate; styles 3; capsule teeth 6.

Usefulness: For.

706. Eremogone griffithii (Boiss.) Ikonn.

Synonyms: Arenaria griffithii Boiss.



Phytogeographical element: I-T

Habitat: Juniper forests, steppes, xeric shrubs, forbs

Elevational range: 2200 - 4200 Flowering period: VI - VII

Remarks: Cryptophyte; plant 5–20(–30) cm high; leaf blade linear-subulate or subulate; peduncle with 1–7(–9)-flowered, glabrous or glandular hairy with erect

or slightly curved hairs.

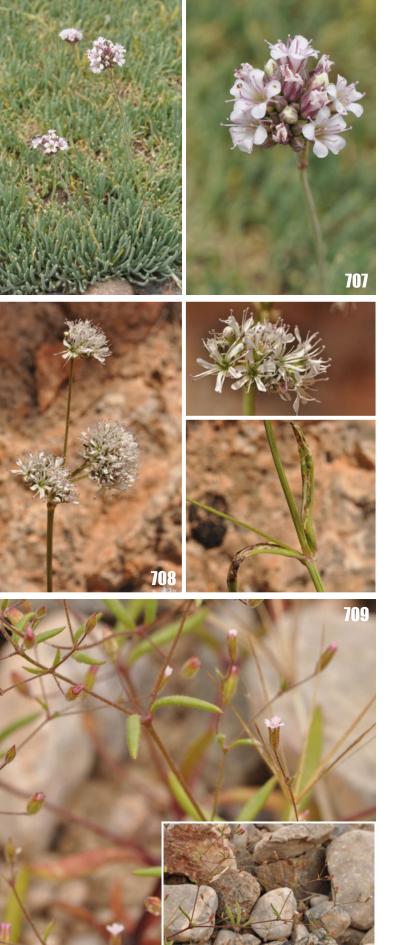












707. Gypsophila capituliflora Rupr.



Phytogeographical element: EI-T Habitat: Semi-deserts, alpine steppes Elevational range: 3800 - 4150 Flowering period: VII - VIII

Remarks: Chamaephyte; plant up to 25 cm high; stems, caespitose, glabrous; leaves linear, subtrigonous, glabrous;

inflorescence subcapitate.

Usefulness: For.

708. Gypsophila cephalotes (Schrenk) F.N. Williams



Phytogeographical element: I-T

Habitat: River beds, loose sandy screes, screes

Elevational range: 3400 - 3500 Flowering period: VI - IX

Remarks: Cryptophyte; plant 20–50 cm high; inflorescences concentrated into capitula, pedicels 0.5–2.5 mm; bracts and calyx lobes undulate at margin,

not ciliate; seeds truncately tuberculate.

709. Gypsophila floribunda (Kar. & Kir.) Turcz. ex Fenzl



Phytogeographical element: I-T

Habitat: Screes

Elevational range: 1000 - 2200 Flowering period: VI - VIII

Remarks: Therophyte; plant 5–10 cm high with divaricate branches; stems purplish, glandular–pubescent; leaves sessile, $5-10 \times 1-2$ mm, apex obtuse; inflorescence a panicle with flowers in dichasia; bracts minute, lanceolate; calyx 3–4 mm; petals ca. 4 mm, oblong, white or pink at the apex, hardly exceeding the calyx; capsule ca. 4 mm, slightly exserted from the calyx.

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710. Gypsophila herniarioides Boiss.



Phytogeographical element: I-T

Habitat: River beds, juniper forests, steppes

Elevational range: 2700 - 4400 Flowering period: VI - IX

Remarks: Cryptophyte; plant up to 7 cm high; caespitose with decumbent to prostrate stems; leaves 4–6 mm, apparently forming dense whorls at the nodes;

inflorescence capitate.

711. Herniaria glabra L.



Phytogeographical element: I-T, E-S, M

Habitat: River beds, ruderal Elevational range: 800 - 2400 Flowering period: IV - VII

Remarks: Cryptophyte; plant 3-8 (-15) cm high; green,

glabrous.

712. Herniaria hirsuta L.



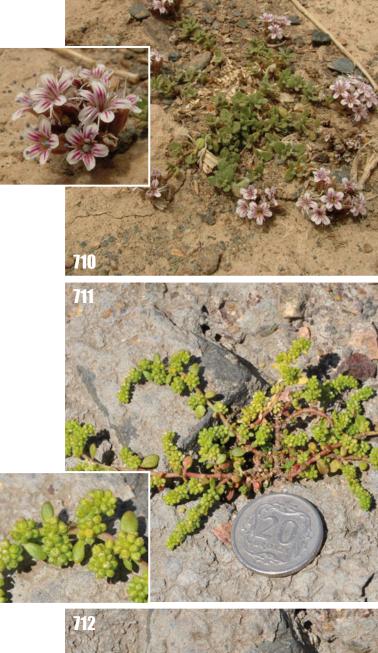
Phytogeographical element: I-T, E-S, M

Habitat: River beds, ruderal, fields, xeric shrubs

Elevational range: 400 - 1800 Flowering period: V - IX

Remarks: Cryptophyte; plant 3–8(–15) cm high, greygreen, hirsute; calyx and leaves covered with protruding and long hairs; stamens 2–3 (rarely 5); capsule not much

shorter than the calyx.













713. Holosteum umbellatum L.



Phytogeographical element: Plurireg

Habitat: River beds, fields Elevational range: 400 - 900 Flowering period: II - III

Remarks: Therophyte; plant 3–20 cm high; involucres and lower parts of flower peduncles glabrous; stamens 3–5.

714. Holosteum umbellatum L. subsp. glutinosum (M. Bieb.) Nyman

Synonyms: *Holosteum glutinosum* (M. Bieb.) Fisch. & C.A. Mey.



Phytogeographical element: Caryophyllaceae, Plurireg

Habitat: River beds, fields Elevational range: 400 - 900 Flowering period: II - III

Remarks: Therophyte; plant 4-25 cm high; involucres and

flower peduncles glandular; stamens 8–10.

715. Lepyrodiclis holosteoides (C.A. Mey.) Fenzl ex Fisch. & C.A. Mey.



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Phytogeographical element: I-T, M

Habitat: Ruderal, fields Elevational range: 400 - 1500 Flowering period: IV - VII

Remarks: Therophyte; plant 10–50(–100) cm high; petals

ovate, slightly emarginate at apex.

716. Lepyrodiclis stellarioides Fisch.& C.A. Mey.



Phytogeographical element: I-T

Habitat: Ruderal, thermophilous shrubs, forbs

Elevational range: 650 - 3000 Flowering period: IV - VII

Remarks: Therophyte; plant 9–70 cm high; petals

lanceolate, deeply emarginate at apex.

717. Lychnis coriacea Moench

Synonyms: *Coronaria coriacea* (Moench) Schischk. ex Gorschk., *Lychnis coronaria* (L.) Desr.



Phytogeographical element: I-T, M, Himal Habitat: River beds, steppes, xeric shrubs

Elevational range: 1200 - 1600 Flowering period: V - VII

Remarks: Cryptophyte; plant 40–80 cm high; plant densely white-villous; calyx 15–20 mm, acuminate, veins

prominent and protruding; capsule oblong.

Usefulness: Orn.

718. Minuartia biflora (L.) Schinz & Thell.



Phytogeographical element: Plurireg

Habitat: Alpine meadows Elevational range: 3400 - 3800

Flowering period: VI

Remarks: Cryptophyte; plant 3–6 cm high; petals subequaling sepals, oblong; sepal apex obtuse; seeds

smooth or rugose.

















719. Minuartia hybrida (Vill.) Schischk.



Phytogeographical element: I-T, E-S, M

Habitat: River beds, loose sandy screes, screes, steppes

Elevational range: 600 - 2000 Flowering period: III - IV

Remarks: Therophyte; plant 10-17 cm high; leaves with 3 veins; sepals 2.5-3.5 mm long, $1.5-2 \times$ as long as petals.

720. Minuartia kryloviana Schischk.



Phytogeographical element: I-T

Habitat: Juniper forests, alpine meadows

Elevational range: 1800 - 3000 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 5–20 cm high; leaves 5–15 \times 0.3-1 mm; sepals ovoid-lanceolate, 3.5-5 mm; petals 2 \times

as long as sepals.

721. Minuartia meyeri (Boiss.) Bornm.



Phytogeographical element: I-T

Habitat: Juniper forests, steppes, screes

Elevational range: 600 - 2000 Flowering period: III - VI

Remarks: Cryptophyte; plant 5–20 cm high; leaves with 5–7 vains; sepals 5–9 mm long, 4–7 \times as long as petals.

722. Minuartia verna (L.) Hiern



Phytogeographical element: Plurireg Habitat: Alpine meadows, alpine pastures

Elevational range: 3000 - 3600 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 5–10 cm high; petals subequaling sepals, petals ovate, sepal apex acute to shortly acuminate; seeds sharply tuberculate.

723. Oberna wallichiana Ikonn.

Synonyms: Oberna behen (L.) Ikonn., Silene wallichiana Klotzsch



Phytogeographical element: I-T, Himal

Habitat: Broad-leaved forests, riverside forests, meadows,

forbs

Elevational range: 400 - 3000 Flowering period: V - VII

Remarks: Cryptophyte; plant 40–110 cm high; calyx 14–18 mm with 20 veins, glabrous; petals 16–17 mm,

dissected up to 5 mm.

724. Petrorhagia alpina (Hablitz) P.W. Ball & Heywood

Synonyms: Fiedleria alpina (Habl.) Ovcz.

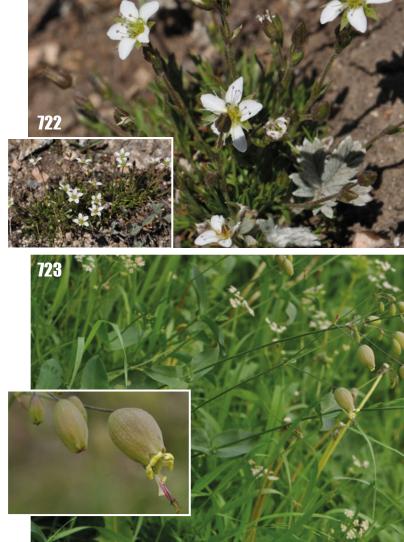


Phytogeographical element: I-T, E-S, M Habitat: Juniper forests, xeric shrubs, forbs

Elevational range: 1300 - 3100 Flowering period: VI - VIII

Remarks: Hemicryptophyte; plant 10–40 cm high; stamens 10; calyx green, 5-veined, ribbed, teeth shortly triangular, apex acute; seeds ovoid, tuberculate; petals 5, white

without coronal scales.

















725. Petrorhagia prolifera (L.) P.W. Ball & Heywood

Synonyms: Kohlrauschia prolifera (L.) Kunth



Phytogeographical element: Plurireg

Habitat: Ruderal

Elevational range: 650 - 1450 Flowering period: IV - VI

Remarks: Therophyte; plant up to 50 cm high, glabrous; leaves opposite 12–30 mm, narrowly linear, grass-like; outer involucre bracts obtuse to mucronate, inner obtuse; flowers not very widely opening, petals truncate or shallowly notched with 1 vein; seeds 1.1–1.8 mm, with distinctive reticulate pattern which differentiates them from *P. nanteuilii* which are tuberculate.

726. Pleconax conoidea (L.) Šourková



Phytogeographical element: I-T, M, E-S Habitat: Ruderal, fields, steppes Elevational range: 900 - 3200 Flowering period: IV - VI

Remarks: Therophyte; plant 15–50 cm high; calyx 20–32 mm with 30 veins; petals only slightly constricted.

727. Pleioneura griffithiana (Boiss.) Rech. f.

Synonyms: Saponaria griffithiana Boiss.



Phytogeographical element: I-T

Habitat: River beds, juniper forests, screes, xeric shrubs

Elevational range: 2300 - 3600 Flowering period: VI - VIII

Remarks: Cryptophyte; plant up to 70 cm high; calyx

slightly shorter than petals, glabrous.

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728. Sagina apetala Ard.

Synonyms: Sagina ciliata Fries



Phytogeographical element: Plurireg

Habitat: Ruderal

Elevational range: 500 - 1500 Flowering period: III - V

Remarks: Therophyte; plant up to 9 cm high, procumbent, glabrous; leaves 4-7 mm, linear-subulate, apex acute, margins sparsely ciliate at base; flowers solitary, 4-merous, white; sepals 1.5 mm, ovate-oblong, obtuse, persistent; petals small, caducous; capsule exceeding the sepals; seed minute, dorsally grooved.

729. Scleranthus annuus L.



Phytogeographical element: A, Plurireg

Habitat: Fields

Elevational range: 2000 - 3000 Flowering period: IV - V

Remarks: Therophyte; plant (2–)5–20(–25) cm high; leaves filiform up to 5 mm long; flower without petals; sepals

acute with membraned margins.

730. Silene sarawschanica Regel & Schmalh.



Phytogeographical element: E, I-T

Habitat: Broad-leaved forests, screes, xeric shrubs, forbs

Elevational range: 900 - 1900 Flowering period: IV - V

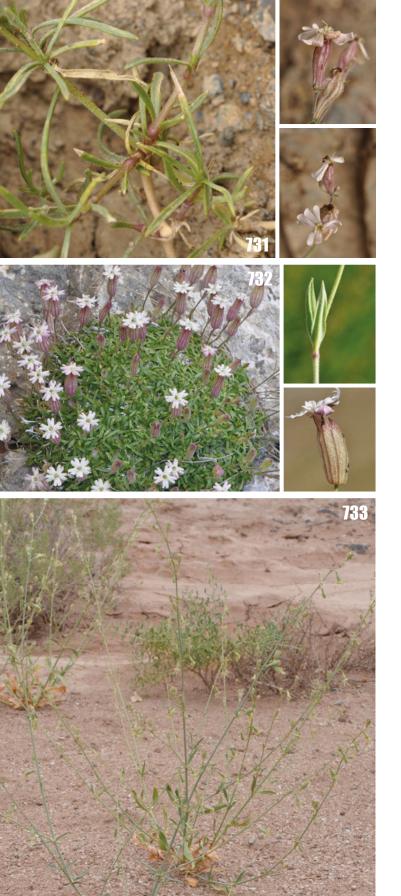
Remarks: Cryptophyte; plant 20–40 cm high; calyx 14–16 mm, elongated, cylindrical, glabrous; petals 14-20 mm.











731. Silene brahuica Boiss.



Phytogeographical element: I-T

Habitat: Juniper forests, rocks, screes, steppes, xeric

shrubs

Elevational range: 700 - 3000 Flowering period: IV - VII

Remarks: Cryptophyte; plant 15–45 cm high; calyx 10–14 mm with 10 veins, pubescent; petals 13–16 mm long, dissected up to 3/4; stamen filaments glabrous.

732. Silene conformifolia Preobr. ex Schischk.

Synonyms: Silene samarkandensis Preobr. subsp. conformifolia Preobr.



Phytogeographical element: E, I-T

Habitat: Rocks

Elevational range: 2450 - 3200 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 15–25 cm high; stem leaves, at least lower, similar in size and shape to rosette leaves, inflorescence (2–)3–6-flowered; 18–23 mm long.

733. Silene glaucescens Schischk.



Phytogeographical element: SE, I-T

Habitat: River beds, rocks, screes, semi-deserts

Elevational range: 700 - 1700 Flowering period: VI - VII

Remarks: Cryptophyte; plant 20–50 cm high; leaves spatulate-lanceolate, glabrous; calyx leathery, club-

cylindrical; petals greenish.

734. Silene graminifolia Otth



Phytogeographical element: EI-T, E-S

Habitat: River beds, rocks, screes, alpine semi-deserts

Elevational range: 3100 - 4900 Flowering period: VI - IX

Remarks: Cryptophyte; plant 17–30(–40) cm high; leaves 1–4 mm wide, linear or linear-lanceolate; calyx 7–11 mm long, bell-shaped, inflated; petals dissected up to 1/2.

735. Silene kuschakewiczii Regel & Schmalh. s. l.

Synonyms: Silene incurvifolia Kar. & Kir. subsp. nodosa Ovcz.



Phytogeographical element: E, EI-T

Habitat: Rocks, screes

Elevational range: 3100 - 3900 Flowering period: VII - VIII

Remarks: Cryptophyte; plants up to 10–18 cm high; leaves

linear; calyx 17–22(–24) mm with obtuse teeth.

736. Silene longicalycina Kom.



Phytogeographical element: I-T

Habitat: Alpine meadows, screes, steppes

Elevational range: 2000 - 3500 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 15–50 cm high; leaves linear; calyx 18–25 mm long, with short hairs; claws and stamens

glabrous.























737. Silene microphylla Boiss.

Synonyms: Silene pamirensis (H. Winkl.) Preobr.



Phytogeographical element: E, EI-T Habitat: Rocks, screes, alpine semi-deserts

Elevational range: 2500 - 4200 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 15–35 cm high, gray-green, forming turf, covered with short and straight hairs; leaves spatulate-lanceolate or wide-oblanceolate; calyx 20–25

(-27) mm long.

738. Silene neoladyginae Lazkov

Synonyms: Silene tianschanica Schischk.



Phytogeographical element: EI-T

Habitat: Rocks

Elevational range: 1200 - 2800 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 20–40 cm high, glabrous; leaves linear or narrowly lanceolate, cauline in 2–3 distant pairs, 2–6 cm \times 1–3 mm with scabrous margin; flowers in a slender, racemiform thyrse; pedicel long, glabrous; calyx tubular–clavate, ca. 10–11 \times 2 mm, glabrous with 10 violet veins; petals white, rarely purplish, ca. 20 mm long; limb narrowly obovate, deeply emarginate; capsule ovoid 7–8 \times 3–4 mm.

739. Silene nevskii Schischk.

Synonyms: Silene bogdanii Ovcz.



Phytogeographical element: E, I-T

Habitat: Rocks

Elevational range: 750 - 2100

Flowering period: IV

Remarks: Chamaephyte; plant 15–20 cm high; forming loose sod with the remains of prickly dead stems and leaves; leaves broad- and almost spatulate-oblanceolate; pedicel 1–2-flowered. Sometimes regarded as just variety

of Silene kuschakewiczii Regel & Schmalh. s.l.

740. Silene quadriloba Turcz. ex Kar. & Kir.

Synonyms: Melandrium quadrilobum (Turcz.) Schischk.



Phytogeographical element: I-T, E-S Habitat: River beds, steppes Elevational range: 3000 - 3050

Flowering period: VII

Remarks: Cryptophyte, hemicryptophyte; plant up to 20 cm high; basal leaves 3–4 \times 5–7 cm, stem leaves 1–2 \times

3-4 cm; petals 22-23 mm with 4 lobes.

741. Silene schugnanica B. Fedtsch.



Phytogeographical element: E, I-T

Habitat: Rocks

Elevational range: 1300 - 2800 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 30–90 cm high; calyx (7–) 9–12 mm with 10 veins, glabrous, membranous; corolla

ca. 12.5 mm long; stamen filaments glabrous.

742. Silene turkestanica Regel

Synonyms: Melandrium turkestanicum (Regel) Vved.



Phytogeographical element: SE, I-T

Habitat: Juniper forests, broad-leaved forests, forbs

Elevational range: 750 - 2600 Flowering period: IV - VI

Remarks: Cryptophyte; plant 50–80 cm high; 3 styles; capsule with 6 teeth; calyx more than 25–30 mm long.















743. Silene uralensis (Rupr.) Bocquet subsp. apetala (L.) Bocquet

Synonyms: Gastrolychnis apetala (L.) Tolm. & Kozhanczikov, Melandrium apetalum (L.) Fenzl



Phytogeographical element: I-T, E-S, Arctic

Habitat: Alpine meadows, fens and mires, alpine steppes

Elevational range: 3500 - 4850 Flowering period: VII - VIII

Remarks: Cryptophyte; plant (3-)10-25(-30) cm high; 5

styles, capsule with 10 teeth, flowers singular.

744. Spergularia media (L.) C. Presl

Synonyms: *Spergularia maritima* (All.) Chiov., *S. marginata* (DC.) Kitt.



Phytogeographical element: I-T, E-S, M

Habitat: Salt marshes Elevational range: 350 - 600 Flowering period: V - VI

Remarks: Cryptophyte; plant 10-25 cm high; all seeds

winged; stamens 9–10.

745. Spergularia microsperma Asch.



Phytogeographical element: I-T

Habitat: Salt marshes Elevational range: 350 - 700 Flowering period: IV - V

Remarks: Therophyte; plant 4–15 cm high; calyx 1.5–2.5 mm; stamens 2–3; all seeds unwinged, pectinate.

746. Stellaria brachypetala Bunge

Synonyms: Stellaria fontana Popov



Phytogeographical element: I-T Habitat: Fens and mires, springs Elevational range: 2500 - 3800 Flowering period: VII - VIII

Remarks: Therophyte; plant 10–15(–20) cm high; stem glabrous, angular; bracts membranous at edges.

Usefulness: Med.

747. Stellaria media (L.) Vill.



Phytogeographical element: Plurireg Habitat: Orchards and gardens, ruderal

Elevational range: 800 - 2300 Flowering period: III - IV

Remarks: Therophyte, hemicryptophyte; plant 5–30 cm

high; stem round; calyx ca. 4 mm.

Usefulness: Med, For.

748. Stellaria turkestanica Schischk.



Phytogeographical element: SE, I-T

Habitat: Screes

Elevational range: 2600 - 4400 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 5–10 cm high, pubescent; styles 3; petals dissected to 1/3–1/2; capsule splitting to

the base by 6 valves.













749. Tytthostemma alsinoides (Boiss. & Buhse) Nevski

Synonyms: Stellaria alsinoides Boiss. & Buhse



Phytogeographical element: I-T

Habitat: Juniper forests, steppes, xeric shrubs

Elevational range: 2200 - 3300 Flowering period: V - VI

Remarks: Therophyte; plant 5–20 cm high; sepals 4; stamens 2; capsule splitting to the base by 4 valves.

750. Vaccaria hispanica (Mill.) Rauschert



Phytogeographical element: Plurireg

Habitat: Fields

Elevational range: 400 - 3600 Flowering period: V - VI

Remarks: Therophyte; plant 30–70 cm high; stems graygreen, glabrous; calyx green, 5-angled, submembranous between angles; petals claw greenish, limb pink.

751. Velezia rigida L.



Phytogeographical element: I-T, M

Habitat: Steppes, xeric shrubs, thermophilous shrubs

Elevational range: 700 - 2000 Flowering period: IV - VII

Remarks: Therophyte; plant 5–40 cm high; calyx with 15

veins, petals with emarginate apex.

752. Euonymus nanus M. Bieb.

Synonyms: Euonymus koopmannii Lauche



Phytogeographical element: M, I-T, E-S

Habitat: Coniferous forests Elevational range: 1400 - 2600 Flowering period: V - VII

Remarks: Nanophanerophyte; plant 50(–100) cm high; leaves narrowly lanceolate or linear, in whorls or opposite,

with folded margins; stems densely verrucose.

753. Parnassia laxmannii Pall. ex Schult.



Phytogeographical element: I-T, E-S, M, Americ N

Habitat: Fens and mires Elevational range: 1300 - 3600 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 11–40 cm high; basal leaves broadly cordate, 1–2 cm long, 0.6–1.8 cm wide, glaucous; petals oblong-ovate, obtuse, usually 9-nerved; staminodes

9–17-lobed.

754. Ceratophyllum demersum L.



Phytogeographical element: Plurireg Habitat: Aquatic vegetation

Elevational range: 500 - 3800 Flowering period: V - VIII

Remarks: Cryptophyte; plant perennial, 40–150 cm high;

plant deeply green with rigid and brittle leaves.

Usefulness: For.



















755. Helianthemum songaricum Schrenk ex Fisch. & C.A. Mey.



Phytogeographical element: I-T Habitat: Screes, steppes Elevational range: 1500 - 3200 Flowering period: V - VII

Remarks: Chamaephyte; plant 5–12 cm high; old branches brown, branchlets opposite or nearly opposite, tightly appressed white pubescent when young; leaves opposite, simple, lanceolate or narrowly ovate, both surfaces white puberulous; sepals 5, unequal; petals yellow or orange-yellow, obovate.

756. Cleome lipskyi Popov



Phytogeographical element: E, I-T Habitat: Rocks, loose sandy screes Elevational range: 800 - 850 Flowering period: VI - VII

Remarks: Therophyte; plant 5–30 cm high; leaves singular, entire, ciliate with two types of glandular hairs; capsule 12–30 mm long and 3–4 mm wide; seeds glabrous.

757. Colchicum kesselringii Regel



Phytogeographical element: I-T

Habitat: Alpine meadows, moraines and snow-beds

Elevational range: 1500 - 3000 Flowering period: III - VI

Remarks: Cryptophyte; plant 5–20 cm high; flowers white;

3–8 leaves, 4–12 mm wide. Usefulness: Med, Orn.

758. Colchicum luteum Baker



Phytogeographical element: I-T

Habitat: Alpine meadows, moraines and snow-beds

Elevational range: 1500 - 3000 Flowering period: IV - VII

Remarks: Cryptophyte; plant 5–20 cm high; flowers yellow; leaves 2–3(–4), 7–30 mm wide.

Usefulness: Med, Orn.

759. Colchicum robustum (Bunge) Stef.

Synonyms: Merendera robusta Bunge



Phytogeographical element: I-T Habitat: Steppes, forbs Elevational range: 350 - 600 Flowering period: III

Remarks: Cryptophyte; plant up to 25 cm high; corm covered with a leathery coat; leaves 3-6, 0.6-2 cm wide; tepal limb 2-6 cm long; flowers (1-)2-3, white or pink.

Usefulness: Hou, Orn.

760. Convolvulus krauseanus Regel & Schmalh.



Phytogeographical element: I-T Habitat: Screes, steppes Elevational range: 650 - 1750 Flowering period: VI - VIII

Remarks: Chamaephyte; dwarf shrub; stem branched; leaves needle like, ca. 0.5 mm wide, silky pubescent;

corolla 17-23 mm, white.



















761. Convolvulus lineatus L.



Phytogeographical element: Plurireg

Habitat: River beds, steppes, thermophilous shrubs

Elevational range: 800 - 3000 Flowering period: V - VII

Remarks: Cryptophyte; plant up to 3–15(–20) cm high; sepals, leaves and stems silky pubescent; leaves 5–12 cm

long

762. Convolvulus pseudocantabrica Schrenk



Phytogeographical element: I-T Habitat: Meadows, steppes Elevational range: 700 - 2900 Flowering period: V - VI

Remarks: Chamaephyte; plant 30–70 cm high; calyx and upper side of leaves glabrous; flowers 1–2 at the end of

the shoot or branch. Usefulness: Med.

763. Convolvulus subhirsutus Regel & Schmalh.



Phytogeographical element: I-T

Habitat: Pastures, fields, steppes, thermophilous shrubs

Elevational range: 500 - 2000 Flowering period: V - VI

Remarks: Cryptophyte; plant perennial, 60–100 cm high; sepals and leaves hirsute and sericeous, sepals at fruiting

time bend aside. Usefulness: Med, For.

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Convolvulaceae

764. Convolvulus tragacanthoides Turcz.

Synonyms: Convolvulus spinifer Popov



Phytogeographical element: I-T Habitat: Rocks, screes Elevational range: 800 - 1600 Flowering period: V - VI

Remarks: Chamaephyte; plant 4–10(–15) cm high; stems forming a compact cushion; leaves sessile, linear, rarely oblanceolate, base attenuate, apex rounded; flower buds never reflexed; flowers 2–6, terminal; sepals elliptic or oblong-obovate, abaxially dull yellow tomentose-villous; corolla pink, funnelform.

765. Cressa cretica L.



Phytogeographical element: I-T, M Habitat: River beds, fields, salt marshes

Elevational range: 350 - 500 Flowering period: VI - VII

Remarks: Cryptophyte; plant perennial, 5–30(–35) cm high; flowers 5–6 mm long; stamens longer than corolla;

leaves amplexicaul.

766. Cuscuta approximata Bab.

Synonyms: Cuscuta cupulata Engelm.



Phytogeographical element: Plurireg Habitat: River beds, meadows, fields Elevational range: 300 - 2400 Flowering period: VI - IX

Remarks: Therophyte; stems filiform, less than 1 mm in diameter; inflorescences compact glomerules; flowers sessile; sepals thickened and fleshy abaxially; styles 2; stigmas clavate, elongated; style and stigmas as long as or

longer than ovary.





















767. Cuscuta bucharica Palib.



Phytogeographical element: E, I-T

Habitat: Meadows, steppes, thermophilous shrubs

Elevational range: 900 - 2500 Flowering period: VII - IX

Remarks: Therophyte; stems thread-like, strong, 1.5–3 mm in diameter; inflorescences compact glomerules; flowers 5–8 mm in diameter, petals ca. 3x longer than sepals; sepals thickened with pink appendage; styles 1; stigmas ovoid; style and stigmas equaly or almost equaly long.

768. Cuscuta epilinum Weihe



Phytogeographical element: Plurireg

Habitat: Fields

Elevational range: 900 - 2300 Flowering period: V - VII

Remarks: Therophyte; stem up to 0.7 mm in diameter, greenish or yellowish; calyx and corolla glabrous, 5-merous; calyx 1.5–2.5 mm; petals pale yellow, ca. 3 mm.

769. Cuscuta gigantea Griff.



Phytogeographical element: I-T

Habitat: River beds, riverside forests, loose sandy screes

Elevational range: 2100 - 2800 Flowering period: VII - IX

Remarks: Therophyte; stems thin or stout; inflorescences racemose, compact; flowers 5–7 mm, short pedicellate; corolla scales reaching middle of tube, corolla tube not more than $2 \times \text{longer}$ as calyx; style 1; stigma ligulate; often parasitic on shrubs.

770. Cuscuta monogyna Vahl



Phytogeographical element: Plurireg

Habitat: Meadows, orchards and gardens, fields

Elevational range: 350 - 2600 Flowering period: VI - VIII

Remarks: Therophyte; stems thread-like, strong, 1–3 mm in diameter; inflorescences dense; calyx cupular with 5 ovate-circular sepals; corolla rose, 3–3.5 mm long; capsule

ovoid-globose, ca. 5 mm long.

771. Ipomoea purpurea (L.) Roth



Phytogeographical element: A, Plurireg

Habitat: Ruderal, fields Elevational range: 350 - 550 Flowering period: VI - IX

Remarks: Therophyte; plant up to 2–3 m high, short pubescent mixed with longer retrorse hirsute hairs; corolla red, reddish purple, or blue-purple, fading to white center, funnelform, 4–6 cm, glabrous; stamens unequal, longest stamens reaching middle of corolla tube, filaments pubescent basally; ovary 3-loculed; stigma 3-lobed.

772. Clementsia semenovii (Regel & Herder) Boriss.



Phytogeographical element: I-T Habitat: Fens and mires, springs Elevational range: 1850 - 4000 Flowering period: VI - VII

Remarks: Cryptophyte; plant 35–60 cm high; inflorescence long, dense, spike-like; flowers bisexual, white or pink;

fruitlet with long protruding appendage.















773. Pseudosedum condensatum Boriss.



Phytogeographical element: E, I-T

Habitat: Juniper forests, rocks, screes, steppes, xeric

shrubs

Elevational range: 1750 - 3600 Flowering period: V - VI

Remarks: Cryptophyte; plant 15–30 cm high; roots numerous, thin, with rare small tuberoid thickenings;

stamens 12. Usefulness: For.

774. Pseudosedum fedtschenkoanum Boriss.



Phytogeographical element: E, I-T

Habitat: Screes, steppes Elevational range: 450 - 2200 Flowering period: III - V

Remarks: Cryptophyte; plant (7–)12(–20) cm high; roots numerous, thin, with oval or round tuberoid thickenings; flowers narrowly bell-shaped; stamens 10, all shorter than

corolla.

775. Pseudosedum ferganense Boriss.



Phytogeographical element: I-T Habitat: Semi-deserts, steppes Elevational range: 500 - 1200 Flowering period: IV - V

Remarks: Cryptophyte; plant up to 20 cm high; root crown stout, ca. 1.5 cm in diameter; leaves linear 0.5–2 cm long and ca. 2 mm wide; inflorescence corymbiform, many flowered; bracts oblong to lanceolate, smaller than leaves, apex obtuse; pedicels 0.5–1 mm; sepals lanceolate–oblong 7–10 mm; corolla reddish, tube ca. 8–9 mm; anthers ca. 1 cm, violet.

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Crassulaceae

776. Rhodiola coccinea (Royle) Boriss.



Phytogeographical element: I-T Habitat: Rocks, screes, alpine steppes Elevational range: 2900 - 4800 Flowering period: VI - VII

Remarks: Cryptophyte; plant 10-40 cm high; caudex leaves brown, scalelike, 5×6 -8 mm; stem leaves linear-lanceolate, 5- 7×1 -1.5 mm; inflorescences corymbiform, compact, 0.8-1 cm in diam., few flowered; flowers unisexual, (4 or)5-merous, petals red or yellow, oblong-ovate to subobovate, 1.5-4 mm.

Usefulness: For.

777. Rhodiola gelida Schrenk ex Fisch. & C.A. Mey.

Synonyms: Rhodiola gelida Schrenk



Phytogeographical element: I-T

Habitat: Rocks, screes, moraines and snow-beds

Elevational range: 3600 - 4800 Flowering period: VI - VII

Remarks: Cryptophyte; plant 3-5(-10) cm high; calyx and

corolla yellow, sometimes calyx reddish.

Usefulness: For.

778. Rhodiola heterodonta (Hook. f. & Thomson) Boriss.



Phytogeographical element: I-T, E-S

Habitat: Rocks, loose sandy screes, screes, steppes

Elevational range: 2200 - 4000 Flowering period: V - VI

Remarks: Cryptophyte; plant (10–)30–40 cm high; leaves flat 0.8–1 cm long, 0.2–0.5 cm wide, slightly dentate.

Usefulness: For.



















779. Rosularia alpestris (Kar. & Kir.) Boriss.



Phytogeographical element: I-T

Habitat: Rocks, screes, alpine steppes, xeric shrubs

Elevational range: 1500 - 3900 Flowering period: VI - VII

Remarks: Cryptophyte; plant 3–8 (–12) cm high; petals 6–9 mm, reddish, violet or white; calyx $2 \times$ shorter than

corolla

780. Rosularia glabra (Regel & Winkl.) A. Berger



Phytogeographical element: E, I-T

Habitat: Juniper forests, steppes, xeric shrubs, forbs

Elevational range: 1500 - 4000 Flowering period: V - VI

Remarks: Cryptophyte; plant 6–25 cm high, glabrous; flowers yellow or greenish-yellow; petals 5–8 mm long.

781. Rosularia lutea Boriss.



Phytogeographical element: E, I-T Habitat: Rocks, xeric shrubs Elevational range: 2000 - 2900

Flowering period: VII

Remarks: Cryptophyte; plant 3–5 (–10) cm high; stems and leaves glabrous, only sometimes with scattered cilia

on leaf margin; flowers yellow

782. Rosularia platyphylla (Schrenk) A. Berger



Phytogeographical element: EI-T Habitat: Rocks, screes Elevational range: 1100 - 1950 Flowering period: VI - VII

Remarks: Cryptophyte; plant up to 11 cm high; rosette leaves rhomboid–obovate to spatulate $15-40 \times 12-20 \text{ mm}$, densely glandular hairy with ciliate margin; flowering stems 1-4, simple, ascending, puberulent; stem leaves remote, $10-15 \times 4-5 \text{ mm}$; inflorescences cymose–corymbiform, glandular–pubescent, many flowered; sepals ovate ca. 3 mm; corolla white 5-7 mm; tube ca. 2.5 mm; lobes reflexed, ovate.

783. Sedum bucharicum Boriss.



Phytogeographical element: E, I-T Habitat: Rocks, screes, steppes Elevational range: 650 - 1600 Flowering period: IV - VI

Remarks: Therophyte; plant 4-5 cm high; calyx shorter

than corolla; stamens 12.

784. Sedum ewersii Ledeb.

Synonyms: Hylotelephium ewersii (Ledeb.) H. Ohba



Phytogeographical element: I-T, Himal

Habitat: Rocks, xeric shrubs, moraines and snow-beds

Elevational range: 1700 - 4000 Flowering period: VII - VIII

Remarks: Cryptophyte; plant (5–)10–20(–25) cm high;

leaves 1.5–2 cm wide; flowers pink or purple.













785. Sedum tetramerum Trauty.

Synonyms: Sedum aetnense Tineo. subsp. tetramerum (Trautv.) Breistr.



Phytogeographical element: I-T Habitat: Rocks, screes, steppes Elevational range: 700 - 1300 Flowering period: IV - V

Remarks: Therophyte; plant 2–5 cm high; calyx longer than

corolla; stamens 4.

786. Juniperus polycarpos K. Koch var. seravschanica (Kom.) Kitam.

Synonyms: Juniperus seravschanica Kom.



Phytogeographical element: I-T Habitat: Juniper forests Elevational range: 1000 - 2500 Flowering period: III - IV

Remarks: Megaphanerophyte; plant 12–18 m high; branchlets 1.2–1.5 mm in diameter; scalelike leaves elongated-lanceolate or oval to rhomboid on the top branchlets, needle-like leaves thin and soft, lanceolate; seed cones spherical, 12–14 mm in

diameter, 2-3-seeded rarely 4-seeded.

Usefulness: Ind.

787. Juniperus pseudosabina Fisch. & C.A. Mey.

Synonyms: Juniperus turkestanica Kom.



Phytogeographical element: SE, I-T

Habitat: Juniper forests
Elevational range: 2000 - 3700
Flowering period: III - IV

Remarks: Megaphanerophyte; plant up to 18 m high; branchlets 4-angled or sometimes terete, ultimate branchlets thicker than 1 mm (to 2 mm), branchlets tapering; scalelike leaves decussate or in whorls of 3; pollen cones ovoid or subglobose, 2–3 mm; seed cones ovoid, 1-seeded.

Usefulness: Ind.

788. Juniperus sabina L.



Phytogeographical element: Plurireg Habitat: Alpine shrubs, juniper forests Elevational range: 1800 - 3300

Flowering period: III - IV

Remarks: Nanophanerophyte; shrub up to 1.5 m with grayish-brown bark; on adult plants mainly scalelike leaves, decussate, rhomboid or rhomboid–ovate, 1–2.5 mm, abaxial gland central, prominent, elliptic; seed cones pale brownish green, brown, purplish blue or black when ripe, irregularly globose, 5–8 × 5–9 mm, 1 or 2-seeded; seeds ovoid, slightly flattened, 4–5 mm, ridged, with resin pits.

789. Juniperus semiglobosa Regel

Synonyms: Juniperus schugnanica Kom.



Phytogeographical element: I-T Habitat: Juniper forests Elevational range: 1600 - 3300 Flowering period: III - IV

Remarks: Megaphanerophyte; plant 10–15 m high; branchlets loosely arranged, terete, 1–2 mm in diameter; leaves scalelike, needle-like only on young plants; pollen cones ellipsoid, 3–5 mm; seed cones obovoid-globose or nearly triangular and

widest near ape; fruit 2- or 3-seeded.

Usefulness: Ind.

790. Platycladus orientalis (L.) Franco

Synonyms: Biota orientalis Endl., Thuja orientalis L.



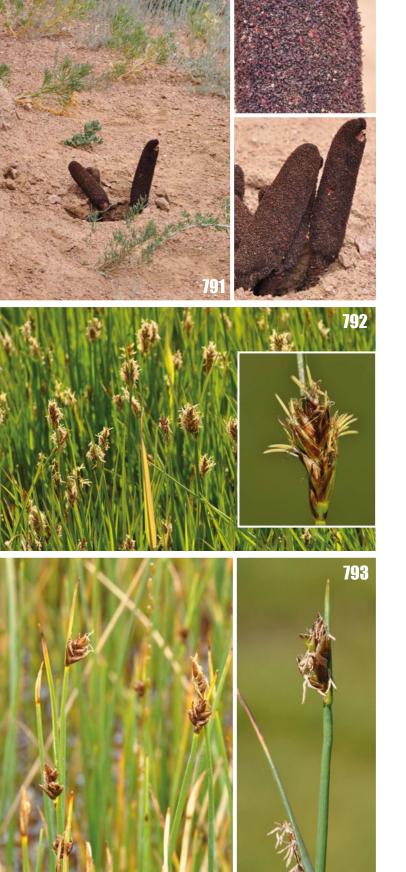
Phytogeographical element: A, Orient Habitat: River beds, riverside forests Elevational range: 700 - 900 Flowering period: III - V

Remarks: megaphanerophyte; plant more than 20 m high; bark reddish brown to light grayish brown; leaves 1–3 mm, apex bluntly pointed; facial leaves rhomboid, with a conspicuous, linear, glandular groove at center abaxially; pollen cones yellowish green, ovoid, 2–3 mm; seed cones when immature bluish green, subglobose, ca. 3 mm in diameter.









791. Cynomorium coccineum L. subsp. songaricum (Rupr.) J. Léonard

Synonyms: Cynomorium songaricum Rupr.



Phytogeographical element: I-T Habitat: Semi-deserts, steppes Elevational range: 350 - 600 Flowering period: IV - V

Remarks: Cryptophyte; plant 10–25 cm high; stem straight, circular, 1.5–3 cm in diameter; inflorescence very

dense, club-shaped, many flowered.

Usefulness: Med, For.

792. Blysmus compressus (L.) Panz. ex Link



Phytogeographical element: Plurireg

Habitat: Fens and mires Elevational range: 1000 - 4000 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 9-30 cm high; stem flattened,

in upper section 3-angular.

793. Blysmus rufus (Huds.) Link



Phytogeographical element: Plurireg Habitat: Fens and mires, salt marshes Elevational range: 3600 - 4000 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 3–20 cm high; culms subterete; nutlet 3.5–4 mm; perianth bristles shorter than

nutlet or absent.

794. Bolboschoenus glaucus (Lam.) S.G. Sm.



Phytogeographical element: I-T, M Habitat: Fields, littoral vegetation Elevational range: 850 - 2350 Flowering period: V - VIII

Remarks: Cryptophyte; plant up to 150 cm high; widest leaf blade 2–6 mm wide; inflorescence mostly branched multiple spike; spikes from dark brown to pale yellow; stigmas 3; nut trigonous 2.5–3.3 mm.

795. Bolboschoenus maritimus (L.) Palla subsp. affinis (Roth) T. Koyama

Synonyms: Bolboschoenus popovii Egor., B. affinis (Roth) Drobow



Phytogeographical element: I-T

Habitat: Salt marshes, littoral vegetation

Elevational range: 300 - 900 Flowering period: V - VIII

Remarks: Cryptophyte; plant 10–50 cm high; glumes pale yellow; stigmas 2; anthers ca. 1 mm; nutlet biconvex

2–2.5 mm. Usefulness: Foo.

796. Bolboschoenus yagara (Ohwi) Y.C. Yang & M. Zhan

Synonyms: Bolboschoenus yagara (Ohwi) A.E. Kozhevnikov



Phytogeographical element: I-T, E-S Habitat: Fields, littoral vegetation Elevational range: 1300 - 2100 Flowering period: V - VII

Remarks: Cryptophyte; plant 60-150 cm high; stigmas 3;

nutlet 3-sided; inflorescence a simple anthela.













797. Carex arcatica Meinsh.



Phytogeographical element: I-T

Habitat: Riverside forests, fens and mires

Elevational range: 1600 - 2600 Flowering period: VI - VII

Remarks: Cryptophyte; plant 20–50 cm high; spikes in long sparse inflorescence; utricles unveined, with short,

smooth beak; 2 stigmas.

798. Carex atrofusca Schkuhr

Synonyms: Carex oxyleuca V. Krecz.



Phytogeographical element: EI-T Habitat: Fens and mires Elevational range: 3500 - 4500 Flowering period: VII - IX

Remarks: Cryptophyte; plant 10–25 cm high; leaves 2.5–5 mm wide, flat; spikes all pedunculate; utricles papillose, not lustrous; beak cylindrical, 0.2–0.5 mm.

799. Carex capillaris L.

Synonyms: Carex karoi (Freyn) Freyn



Phytogeographical element: I-T

Habitat: Riverside forests, fens and mires

Elevational range: 2000 - 3100 Flowering period: V - VIII

Remarks: Cryptophyte; plant (5–) 20–40(–50) cm high; utricules without veins, 2–2.5 mm long; 3 stigmas.

800. Carex decaulescens V.I. Krecz.



Phytogeographical element: I-T

Habitat: Riverside forests, fens and mires

Elevational range: 1600 - 3900 Flowering period: V - VII

Remarks: Cryptophyte; plant 10–130 cm high; terminal spike longer than the others; male flowers mostly with 3 stamens; female flowers with 2 or 3 stigmas and glumes

ca. 2.5 mm.

801. Carex diluta M. Bieb.



Phytogeographical element: I-T, E-S, M

Habitat: River beds, riverside forests, littoral vegetation

Elevational range: 350 - 2500 Flowering period: V - VI

Remarks: Cryptophyte; plant (15–) 30–60(–100) cm high; spikes 1.5–3 cm long; lower bract not longer than inflorescence; utricles 3–4 mm with prominent veins;

3 stigmas. Usefulness: For.

802. Carex enervis C.A. Mey.



Phytogeographical element: I-T

Habitat: Fens and mires, littoral vegetation

Elevational range: 2500 - 2550 Flowering period: VI - VII

Remarks: Cryptophyte; plant 10–30 cm high; leaf blades flat or plicate; utricles papery, nerveless or faintly veined

or veined at base. Usefulness: For.











803. Carex koshewnikowii Litv.



Phytogeographical element: I-T

Habitat: Rocks

Elevational range: 1200 - 3000 Flowering period: IV - VII

Remarks: Cryptophyte; plant 20–60 cm high; utricles

5–7 mm, densely pubescent; 3 stigmas.

804. Carex melanostachya M. Bieb. ex Willd.



Phytogeographical element: I-T, M, E-S

Habitat: Broad-leaved forests, riverside forests, meadows,

fens and mires

Elevational range: 900 - 2500 Flowering period: IV - V

Remarks: Cryptophyte; plant 20–50 cm high; female glumes ovate, aristate at apex, 3.5–4.5 mm; utricles ovate ca. 5 mm, with slightly concave veins; nutlets obovate, ca.

2 mm.

Usefulness: For.

805. Carex microglochin Wahlenb.



Phytogeographical element: I-T, E-S, Arct Habitat: Fens and mires, salt marshes Elevational range: 2500 - 4400 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 5–20 cm high; spike single and terminal; stigmas 3; all female glumes obtuse at apex;

utricles 3.5–4.5 mm.

350

Cyperaceae

806. Carex nebularum Phil.

Synonyms: Carex pycnostachya Kar. & Kir.



Phytogeographical element: I-T, E-S

Habitat: Fens and mires Elevational range: 3800 - 3850 Flowering period: VII

Remarks: Cryptophyte; plant 10–50 cm high; leaf blades rather broad, flat, 4–6 mm wide; utricles papery or

membranous, 5-8-veined.

807. Carex orbicularis Boott



Phytogeographical element: I-T Habitat: Fens and mires Elevational range: 1500 - 4200 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 10–40(–60) cm high; glumes almost black; 2–4 spikelets in dense inflorescence; 2

stigmas. Usefulness: For.

808. Carex pachystylis J. Gay



Phytogeographical element: I-T

Habitat: Steppes

Elevational range: 350 - 3000 Flowering period: II - III

Remarks: Cryptophyte; plant 7–30 cm high; densely tufted plant with basal rosette of leaves and black sheath at base; inflorescence terminal, compound spike on 3–7 assembled in compact black head; nutlets 2–2.5 mm convex on both

sides, without veins.

Usefulness: For.





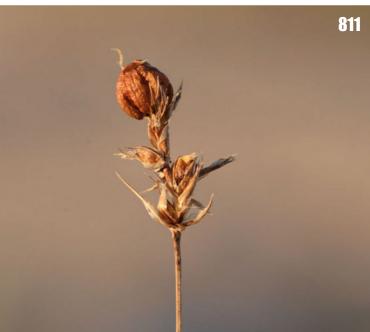












809. Carex pamirensis C.B. Clarke



Phytogeographical element: EI-T Habitat: Littoral vegetation Elevational range: 3000 - 4200 Flowering period: VII

Remarks: Cryptophyte; plant 60–90 cm high; utricles oblong-ovate or ovate, 4–5.5 mm., apex attenuate into a beak, emarginate, not 2-toothed; male spikes 2 to several, inserted at top of culm; female glumes oblong-lanceolate, slightly shorter than or nearly equaling utricle.

810. Carex parva Nees



Phytogeographical element: I-T, E-S Habitat: Fens and mires Elevational range: 2500 - 4200

Flowering period: VII - IX

Remarks: Cryptophyte; plant 10–35 cm high; spike single and terminal; stigmas 3; all female glumes obtuse at apex; utricles 3.5–4.5 mm.

811. Carex physodes M. Bieb.



Phytogeographical element: I-T

Habitat: River beds, semi-deserts, deserts

Elevational range: 350 - 400 Flowering period: III - V

Remarks: Cryptophyte; plant 20–25 cm high; stigmas 2; utricles strongly inflated bulliform to globose or elliptic at

maturity, 10–15 mm. Usefulness: For.

352

Cyperaceae

812. Carex polyphylla Kar. & Kir.



Phytogeographical element: I-T, M, E-S Habitat: Broad-leaved forests, riverside forests

Elevational range: 1100 - 2000 Flowering period: V - VII

Remarks: Cryptophyte; plant 50–120 cm high; plant not cespitose; stigmas 2; utricules 5–6 mm, without veins;

spikes singular, sessile.

813. Carex pseudofoetida Kük.



Phytogeographical element: I-T Habitat: Fens and mires, springs Elevational range: 2400 - 4300 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 3–10 cm high; leaf blades linear-involute; utricles faintly veined; female glumes

ovate or elliptic, castaneous-brown.

Usefulness: For.

814. Carex regeliana (Kük.) Litv.



Phytogeographical element: I-T

Habitat: Riverside forests, meadows, steppes

Elevational range: 2300 - 3200 Flowering period: VI - VII

Remarks: Cryptophyte; plant 40–70 cm high; utricles compressed trigonous with long beak; spikes 5–8 with

peduncles 3-6 cm; style glabrous.



















815. Carex stenocarpa Turcz. ex V.I. Krecz.



Phytogeographical element: I-T, E-S

Habitat: Alpine meadows, pastures, steppes

Elevational range: 1800 - 4500 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 25–70 cm high; leaf blades flat, 3–6 mm wide; rhizome without stolons; stigmas 3; utricles 3–6 mm with long beak; female glumes not ciliate on upper margins; female spikes with peduncles 3–6 cm, pendent.

Usefulness: For.

816. Carex stenophylla Wahlenb. subsp. stenophylloides (V.I. Krecz.) T.V. Egorova

Synonyms: Carex dimorphotheca Stschegl., C. stenophylloides V.I. Krecz.



Phytogeographical element: I-T

Habitat: Semi-deserts, salt marshes, steppes, forbs

Elevational range: 600 - 4500 Flowering period: IV - VIII

Remarks: Cryptophyte; plant 5–20 cm high; spikes bisexual, sessile; female glumes usually shorter than utricles with narrower hyaline margins; utricles planoconvex, leathery, margins acutely angled; beak serrulate.

Usefulness: For.

817. Carex turkestanica Regel

Synonyms: Carex verae Ovcz. & Czuk.



Phytogeographical element: I-T Habitat: Steppes, xeric shrubs, forbs Elevational range: 900 - 3500

Flowering period: IV - VI

Remarks: Cryptophyte; plant (10–) 20–35(–50) cm high; leaves 1.5–3.5 mm wide; stigmas 3; spikelet 0.5–2 cm;

utricules glabrous, smooth.

Usefulness: For.

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818. Carex viridula Michx.

Synonyms: Carex serotina Mérat, C. philocrena V.I. Krecz.



Phytogeographical element: Plurireg

Habitat: River beds, riverside forests, littoral vegetation

Elevational range: 350 - 2700 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 10–35(–45) cm high; 3 stigmas; inflorescence with 4–7 densely concentrated spikes 0.8–1 cm long; utricules 2.5–3 mm; lowest bract

longer than inflorescence.

819. Cyperus difformis L.



Phytogeographical element: M, I-T, Tropic, I-I, Orient

Habitat: Fields

Elevational range: 350 - 1300 Flowering period: VIII - X

Remarks: Therophyte; plant 2–65 cm high; leaf blade 2–6 mm wide, flat or folded; spikelets numerous, densely

congested into a dense capitulum.

820. Cyperus fuscus L.



Phytogeographical element: Plurireg

Habitat: River beds, fields Elevational range: 300 - 1600 Flowering period: VI - IX

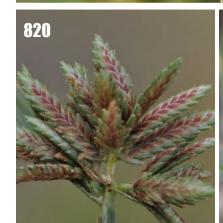
Remarks: Therophyte; plant 6–30 cm high; plant with fibrous roots, culms tufted; inflorescences anthelate, with elongate rays; spikelets ca. 1.5 mm wide; glumes broadly ovate, purplish brown to brown and yellowish green

between both lateral veins.























821. Cyperus iria L.



Phytogeographical element: Plurireg

Habitat: River beds, fields Elevational range: 350 - 850 Flowering period: VIII - X

Remarks: Therophyte; plant 8–80 cm high; leaf blade 2–5 mm wide, slightly folded or flat; rachilla not winged; successive glumes 0.7–0.9 mm apart on same side of

rachilla; inflorescence a simple anthela.

822. Cyperus laevigatus L.

Synonyms: Acorellus laevigatus (L.) Palla



Phytogeographical element: Plurireg

Habitat: River beds, fields Elevational range: 350 - 850 Flowering period: VII - IX

Remarks: Cryptophyte; plant 15–50 high; glumes acute, pale brown, with clear and numerous veines in the

middle.

823. Cyperus rotundus L.



Phytogeographical element: Plurireg Habitat: River beds, ruderal, fields Elevational range: 300 - 1300 Flowering period: VI - IX

Remarks: Cryptophyte; plant 15–90 cm high; leaf blade bluish green; involucral bracts leaflike, usually flat and longer than inflorescence; rachilla broadly winged; glumes

dark blood-red, ovate to oblong-ovate.

Usefulness: Med, For, Foo.

824. Cyperus serotinus Rottb.

Synonyms: Juncellus serotinus (Rottb.) Clarke



Phytogeographical element: I-T, M, Orient, I-I, E-S

Habitat: River beds, fields Elevational range: 300 - 1000 Flowering period: VIII - X

Remarks: Cryptophyte; plant 35–100 cm high; leaf blade 3–10 mm wide; inflorescence a simple or compound anthela with 5–17 spikelets arranged into spikes.

825. Eleocharis argyrolepis Kierulff

Synonyms: Heleocharis argyrolepis Kjerulff ex Bunge, Scirpus argyrolepis Meinsh.



Phytogeographical element: I-T, E-S Habitat: Littoral vegetation Elevational range: 750 - 2350

Flowering period: IV - VI
Remarks: Cryptophyte: plant

Remarks: Cryptophyte; plant 15–75 cm high; leaf sheaths 1 or 2, purplish red, 1–8 cm; persistent style base shortly

conic to half-oblong; basal 2 glumes empty.

826. Eleocharis mitracarpa Steud.

Synonyms: *Eleocharis equisetiformis* Meinsh., *E. turcomanica* Zeinserl.



Phytogeographical element: I-T Habitat: Littoral vegetation Elevational range: 350 - 2200 Flowering period: V - VII

Remarks: Cryptophyte; plant 30–100 cm high; spikelet oblong-ovoid to narrowly oblong-ovoid, 15–30 mm, many flowered; glume apex subacute; persistent style base globose or wider than long, mammiform or mitriform

(cap-shaped).



















827. Eleocharis quinqueflora (Hartmann) O. Schwarz

Synonyms: Eleocharis (Heleocharis) meridionalis Zinserl.



Phytogeographical element: Plurireg

Habitat: Fens and mires Elevational range: 300 - 3800 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 3–30 cm high; spikelets 4–7 mm, 2–7-flowered; persistent style base subconic to 3-angled–subulate; nutlet 1.9–2.5 mm, appearing smooth

but finely cellular-reticulate.

828. Eleocharis uniglumis (Link) Schult.

Synonyms: Heleocharis uniglumis (Link) Schult.



Phytogeographical element: Plurireg Habitat: Meadows, fens and mires Elevational range: 500 - 3600 Flowering period: V - VI

Remarks: Cryptophyte; plant 10–35 cm high; spikelets 5–10 mm; lowest glume encircling stem, rarely more than 1/3 as long as spikelet; nuts coarsely punctate.

829. Fimbristylis dichotoma (L.) Vahl

Synonyms: Fimbristylis annua (All.) Roem. & Schult., F. dichotoma (L.) Vahl, Scirpus dichotomus L.



Phytogeographical element: I-T, M, I-I

Habitat: River beds, fields Elevational range: 350 - 1400 Flowering period: VI - IX

Remarks: Therophyte; plant 5–50(–100) cm high; rhizomes not prominent, leaf blade more than 1 mm wide; inflorescences 5–9 cm, erect; glumes with 3–5 veins; nutlet with oblong reticulation, obovoid, with obvious vertical ribs, not verruculose.

358

Cyperaceae

830. Isolepis setacea (L.) R. Br.

Synonyms: Scirpus setaceus L., Schoenoplectus setaceus (L.) Palla



Phytogeographical element: Plurireg Habitat: Fens and mires, springs Elevational range: 850 - 2600 Flowering period: VII - IX

Remarks: Therophyte, hemicryptophyte; plant 1.5–6 (–15) cm high; leaves reduced, usually with one complete leaf at stem base; inflorescence 1–2 sessile spikes.

831. Kobresia capillifolia (Decne.) C.B. Clarke

Synonyms: Kobresia capilliformis Ivanova



Phytogeographical element: I-T, E-S

Habitat: Riverside forests, fens and mires, pastures

Elevational range: 2800 - 4600 Flowering period: VI - VIII

Remarks: Cryptophyte; plant (5–)10–45 cm high; rhizomes short; culm slender 0.6–1 mm in diameter; inflorescence spicate; spike more elongate; lower spikelets bisexual.

Usefulness: For.

832. Kobresia humilis

(C.A. Mey. ex Trautv.) Serg.

Synonyms: Kobresia persica Kuk. & Bornm.



Phytogeographical element: I-T Habitat: Fens and mires, pastures Elevational range: 2800 - 4300 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 2–15 cm high; leaves flat, midrib distinct abaxially; lower spikelets bisexual; prophylls with basal female and 2–7 male flowers.

Usefulness: For.



















833. Kobresia laxa Nees

Synonyms: Schoenoxiphium hissaricum Pissjauk.



833

Phytogeographical element: E, I-T Habitat: Riverside forests, fens and mires

Elevational range: 1100 - 2800 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 30–60(–70) cm high; inflorescence branches with leaves; inflorescence a loose or sometimes slightly compact panicle, reddish brown, linear or oblong; nutlets pale yellow or brown, narrowly oblong or elliptic-oblong, trigonous, $2–2.5 \times 0.5–0.8$ mm, slightly beaked.

834. Kobresia schoenoides (C.A. Mey.) Steud.

Synonyms: Kobresia pamiroalaica Ivanova



Phytogeographical element: I-T Habitat: Fens and mires, pastures Elevational range: 3100 - 4500 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 3–60(–70) cm high; leaves basal 1–2 mm wide; bisexual spikelets with 1 basal female flower and (1–)4–7 distal male flowers; inflorescence oblong to clavate $1-4 \times 0.2-1$ cm; nutlets 1.7–3.5 mm.

Usefulness: For.

835. Pycreus flavidus (Retz.) T. Koyama

Synonyms: Pycreus globosus (All.) Rchb., Cyperus globosus All.



Phytogeographical element: I-T, Orient

Habitat: River beds, fields Elevational range: 300 - 1400 Flowering period: VII - IX

Remarks: Therophyte, Cryptophyte; plant 20–50 cm high; glumes yellowish or pale brown; 2 stamens; 2 stigmas.

360

Cyperaceae

836. Schoenoplectiella juncoides (Roxb.) Lye

Synonyms: Scirpus juncoides Roxb., Schoenoplectus juncoides (Roxb.) Palla



Phytogeographical element: I-T, I-I

Habitat: Fields

Elevational range: 350 - 750 Flowering period: VII - IX Remarks: Therophyte; plant

18-70 cm high; culms tufted 1.5-7 mm thick; spikelets elliptic to subcylindric, 3.5-5 mm wide; glumes brown, broadly ovate to ovate, $3-4 \times 1.8-2$ mm; nutlets plano-convex; stigmas 2.

837. Schoenoplectiella lateriflora (J.F. Gmel.) Lye

Synonyms: Scirpus lateriflorus J.F. Gmel., Schoenoplectus oryzetorum (Steud.) V. Krecz.



Phytogeographical element: Plurireg

Habitat: Fields

Elevational range: 350 - 850 Flowering period: VII - IX

Remarks: Therophyte; plant 5-50 cm high; culms, few to many closely packed, ridged, triangular to almost terete; inflorescence bract, shorter than culm; spikelets 1-20, sessile

or shortly pedunculate.

838. Schoenoplectiella mucronata (L.) J. Jung & H.K. Choi

Synonyms: Scirpus mucronatus L., Schoenoplectus mucronatus (L.) Palla



Phytogeographical element: Plurireg

Habitat: Fields

Elevational range: 300 - 900 Flowering period: VII - IX

Remarks: Cryptophyte; plant 40-100 cm high; stem clearly

3-angular; 3 stigmas; nutlets 2-2.5 mm.

Usefulness: Med.



















839. Schoenoplectus tabernaemontani (C.C. Gmel.) Palla

Synonyms: Scirpus tabernaemontani C.C. Gmel.



Phytogeographical element: I-T, M, E-S

Habitat: Littoral vegetation Elevational range: 1600 - 2200 Flowering period: VI - VIII

Remarks: Cryptophyte; plant up to 3 m high; culms terete; involucral bract 1, culmlike, usually shorter than inflorescence; spikelets 4–7(–10) mm; glumes abaxially with reddish resinous spots; stigmas 2; nutlet planoconvex.

840. Schoenoplectus triqueter (L.) Palla

Synonyms: Scirpus triqueter L.



Phytogeographical element: I-T, M, Orient, I-I

Habitat: River beds, fields Elevational range: 350 - 1850 Flowering period: VI - VII

Remarks: Cryptophyte; plant 60–115 cm high; stem only in upper section 3-angular; upper leave longer than

inflorescence.

841. Schoenus nigricans L.



Phytogeographical element: Plurireg Habitat: Meadows, fens and mires Elevational range: 800 - 1500 Flowering period: IV - VII

Remarks: Cryptophyte; plant 30–60 cm high; inflorescence head-shaped with black-brownish glumes; nutlets whitish.

842. Scirpoides holoschoenus (L.) Soják

Synonyms: Holoschoenus vulgaris Link



Phytogeographical element: I-T, M, E-S Habitat: River beds, fields, springs Elevational range: 500 - 1100 Flowering period: V - VI

Remarks: Cryptophyte; plant 30-60(-100) cm high;

spikelets in dense, globular spikes.

843. Scirpus triquetriformis (V. Krecz.) T.V. Egorova

Synonyms: Schoenoplectus triquetriformis V. Krecz.



Phytogeographical element: I-T Habitat: River beds, fields Elevational range: 350 - 1700 Flowering period: V - VIII

Remarks: Cryptophyte; plant 60–120 cm high; stem only in upper section 3-angular; upper leave shorter than

inflorescence.

844. Cystopteris fragilis (L.) Bernh.

Synonyms: Cystopteris emarginato-denticulata Fomin, Cystopteris filix-fragilis (L.) Borbás, Cystopteris fragilis subsp. emarginato-denticulata Fomin



Phytogeographical element: Plurireg Habitat: Rocks, screes, xeric shrubs, forbs

Elevational range: 850 - 3150 Sporing period: VI to VIII

Remarks: Cryptophyte; rhizomes shortly creeping or ascending; fertile fronds (3.5–)20–35 (–49) cm, approximate or caespitose; stipe brown at base, upper part stramineous or chestnut-colored; lamina lanceolate to broadly lanceolate; veins terminating in teeth.





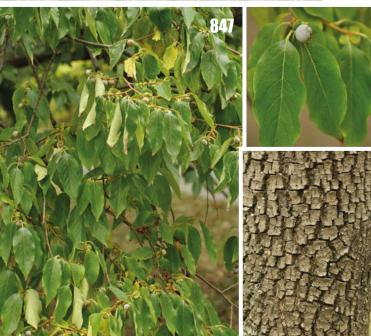












845. Gymnocarpium fedtschenkoanum Pojark.



Phytogeographical element: I-T Habitat: Rocks

Elevational range: 1400 - 1950 Sporing period: VI to VIII

Remarks: Cryptophyte; rhizome up to 4–5 mm in diameter; leaves up to 20–25 cm long, leaflet non-leathery; sori circular or elliptical, uniseriate along each side of costule or midrib.

846. Datisca cannabina L.



Phytogeographical element: I-T, M

Habitat: River beds

Elevational range: 600 - 2300 Flowering period: VI - IX

Remarks: Cryptophyte; plant up to 2 m high; cauline leaves 15–30 cm long; leaflets 5–11, petioled, lanceolate, up to 15 cm long, 2.5–4 cm broad; flowers yellow; fruit 5–9 mm

long, 3–4 mm wide. Usefulness: Med, Foo.

847. Diospyros lotus L.



Phytogeographical element: I-T, M

Habitat: Broad-leaved forests, riverside forests

Elevational range: 1100 - 1400 Flowering period: V - VI

Remarks: Megaphanerophyte; plant up to 20 m high; petiole 0.7–1.5 cm; leaf blade elliptic to ovate-oblong, 5–13 cm long and 2.5–6 cm wide; male flowers 1–3, female flowers subsessile; berries pale yellow, becoming

bluish black at maturity. Usefulness: Foo, Orn.

848. Elaeagnus angustifolia L.

Synonyms: Elaeagnus turcomanica Kozlowsk.



Phytogeographical element: I-T Habitat: River beds, riverside forests Elevational range: 300 - 600

Flowering period: V

Remarks: Megaphanerophyte; plant 5–6(–13) m high; leaves covered by silvery scales; perianth teeth 3-veined.

Usefulness: Med, Foo.

849. Elaeagnus orientalis L.

Synonyms: Elaeagnus angustifolia L. subsp. orientalis (L.) Soják



Phytogeographical element: I-T Habitat: River beds, riverside forests Elevational range: 400 - 2800 Flowering period: V - VI

Remarks: Megaphanerophyte; plant 7–8(–10) m high; leaves covered by silvery scales; perianth teeth with 1

vein.

Usefulness: Foo.

850. Hippophae rhamnoides L.

Synonyms: Elaeagnus rhamnoides (L.) A. Nelson



Phytogeographical element: I-T, E-S

Habitat: River beds

Elevational range: 400 - 3800 Flowering period: IV - V

Remarks: Nanophanerophyte; plant 3–5 m high; leaves 2.5–3 cm long and 0.4–0.7 cm wide; flowers dioecious.

Usefulness: Foo.











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851. Bergia ammannioides Roxb. ex Roth

Synonyms: Bergia ammannioides Heyne ex Roth



Phytogeographical element: I-I, S-S, M

Habitat: Fields

Elevational range: 700 - 1200 Flowering period: VIII - IX

Remarks: Therophyte; plant 10-40 cm high;

flowers (3-) 5-fold, in bunches.

852. Ephedra equisetina Bunge

Synonyms: Ephedra nebrodensis

Tineo subsp. equisetina (Bunge) Breistr. ex Greuter & Burdet



Phytogeographical element: I-T, EI-T

Habitat: River beds, riverside forests, loose sandy screes

Elevational range: 1200 - 2800 Flowering period: VI - VII

Remarks: Nanophanerophyte; plant up to 100 cm high or more; herbaceous branches virgate, often pruinose, 1–1.5 mm in diameter, rigid; integument tube to 2 mm,

straight or slightly curved.

Usefulness: Ind.

853. Ephedra foliata Boiss. ex C.A. Mey.

Synonyms: Ephedra ciliata Fisch. & C.A. Mey., E. kokanica Regel, E. aitchisonii (Stapf) V.A. Nikitin



Phytogeographical element: SE, I-T Habitat: Thermophilous shrubs, forbs

Elevational range: 800 - 1800

Flowering period: V

Remarks: Climber; plant 3-5 m high; liana-shaped shrubs, trunk up to 3-6(-8) cm in diameter; young branches 4-6 mm thick, with elongated (up to 7-8 cm) internodes, gray-green, smooth; leaves filiform, 5-30 mm long; pollen cones (2–)4–6 at nodes; seed cones with 1–2 seeds; seeds 7-8 mm long, flat-convex.

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854. Ephedra gerardiana Wall. ex Stapf

Synonyms: *Ephedra gerardiana* var. *wallichii* Stapf, *E. gerardiana* Wallich



Phytogeographical element: EI-T

Habitat: Juniper forests, rocks, screes, semi-deserts

Elevational range: 2800 - 3500 Flowering period: VII - VIII

Remarks: Nanophanerophyte; plant up to 15 cm high; woody stems buried in soil, parts above ground scabrous, rarely almost smooth; branchlets directed upwards, usually with 1–3 nodes; internodes 1–1.5(–2) cm; bracts of pollen cones in 3 or 4(–6) pairs; apical pair of bracts of seed cones connate for ca. 3/4 their length at most; seeds 1 or 2, oblong, 4–6 mm long, apex obtuse.

855. Ephedra glauca Regel

Synonyms: Ephedra heterosperma V.A. Nikit.



Phytogeographical element: I-T Habitat: Loose sandy screes, screes Elevational range: 1500 - 2200

Flowering period: VI

Remarks: Nanophanerophyte; plant up to 1 m high; young branches 3–5 mm in diameter, first grayish then whitish; seeds widely ovoid up to 6×3 mm, longer than fruit,

agleam.

856. Ephedra minuta Florin



Phytogeographical element: I-T Habitat: Rocks, screes Elevational range: 550 - 1550

Flowering period: VI

Remarks: Nanophanerophyte; plant 5–25 cm high; branchlets erect or slightly spreading, dark green, prominently furrowed, internodes 1.5–3 cm 1.2–1.5 mm; bracts of pollen cones in 1 or 2 pairs; apical bracts of seed cones much longer than others; seeds 6–8(–10) mm, apex acuminate.

























857. Ephedra regeliana Florin

Synonyms: Ephedra pulvinaris V. Nikit.



Phytogeographical element: EI-T

Habitat: Rocks, screes, alpine semi-deserts

Elevational range: 1800 - 4500

Flowering period: VII

Remarks: Nanophanerophyte; plant up to 8(–15) cm high; woody stems above ground, only with several woody basal branches 1–2 cm; bracts of pollen cones in 4–6(–8) pairs; apical pair of bracts of seed cones connate for ca. 5/6 their length or more; seeds 1 or 2, glossy, narrowly ovoid, 3–4.5 mm long.

858. Ephedra strobilacea Bunge



Phytogeographical element: I-T

Habitat: Salt marshes Elevational range: 400 - 500 Flowering period: IV - V

Remarks: Nanophanerophyte; plant up to 2 m high; branchlets 5–6 mm thick, green-gray, later white-gray, smooth or slightly rough; seed cones sessile or shortly pedunculate, with thin, drying bracts; 1–2(–3)-seeded; seeds obovate or oval, 6–7 mm long.

Usefulness: For.

859. Equisetum arvense L.

Synonyms: Equisetum arvense subsp. boreale (Bong.) Tolm., E. boreale Bong.



Phytogeographical element: Plurireg

Habitat: Riverside forests, meadows, fens and mires

Elevational range: 600 - 2800 Flowering period: III - V

Remarks: Cryptophyte; plant 10-50 cm high; stem sheeth

with 10-12 dark-brownish teeth.

Usefulness: Med.

860. Equisetum ramosissimum Desf.

Synonyms: Hippochaete ramosissima (Desf.) Börner



Phytogeographical element: Plurireg

Habitat: River beds, fields Elevational range: 3800 - 4000 Flowering period: III - VIII

Remarks: Cryptophyte; plant 20–100 cm high; stem

branching, grey-greenish; spike acute.

Usefulness: For.

861. Acalypha australis L.



Phytogeographical element: A, I-I, Austral

Habitat: Ruderal

Elevational range: 800 - 900 Flowering period: V - VI

Remarks: Therophyte; plant 20–50 cm high; raylet-leaves ovate, acute, up to 20 mm long, stem leaves lanceolate.

862. Chrozophora tinctoria (L.) A. Juss.

Synonyms: Chrozophora obliqua (Vahl) A. Juss. ex Spreng, Croton obliquus Vahl



Phytogeographical element: I-T, M Habitat: Screes, fields, steppes Elevational range: 400 - 1400 Flowering period: VI - IX

Remarks: Therophyte; plant up to 70 cm high; leaves

lanceolate; seeds and cones with tubercles.























863. Euphorbia alatavica Boiss.



Phytogeographical element: I-T

Habitat: Steppes

Elevational range: 1500 - 2800 Flowering period: VI - IX

Remarks: Cryptophyte; plant up to 50 cm high; stems many, reddish; leaves alternate, slightly spatulate $2-3 \times 1$ cm, villous, base rounded; inflorescence a pseudumbel, primary involucral leaves reddish purple; cyathium sessile, glands 4, brown-yellow, transversely elliptic-orbicular; capsule globose, 3×4 mm, tuberculate, glabrous.

864. Euphorbia chamaesyce L.

Synonyms: *Euphorbia canescens* L., *E. chamaesyce* subsp. *canescens* (L.) Prokh., *Chamaesyce canescens* (L.) Prokh.



Phytogeographical element: I-T, M

Habitat: Screes, steppes Elevational range: 600 - 1400 Flowering period: V - VII

Remarks: Therophyte; plant 3–15 cm high, canescent; leaves ovate; the species is the most similar to *Euphorbia canescens* L. and some of researches treat them as

conspecific species. Usefulness: For.

865. Euphorbia cyrtophylla (Prokh.) Prokh.

Synonyms: Tithymalus cyrtophyllus Prokh.



Phytogeographical element: I-T Habitat: Rocks, screes, alpine steppes

Elevational range: 2500 - 3600 Flowering period: VI - VII

Remarks: Cryptophyte; plant 15–35 cm high; stalk straight, thick; lanceolate leaves often falcate; glands with short blunt horns.

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Euphorbiaceae

866. Euphorbia falcata L.

Synonyms: Euphorbia acuminata Lam., Tithymalus falcatus (L.) Klotzsch & Garcke



Phytogeographical element: I-T, M, E-S

Habitat: Fields, steppes Elevational range: 400 - 3500 Flowering period: V - IX

Remarks: Therophyte; plant 5–20(–35) cm high; ray-leaves opposite, ovate-lanceolate to ovate-deltate or -rhomboid; nectaries moon-shaped or oblong or with two short corners; seeds egg-shaped with 5–10 regular transverse grooves.

grooves.

867. Euphorbia ferganensis B. Fedtsch.



Phytogeographical element: I-T Habitat: Steppes, xeric shrubs Elevational range: 1000 - 2000 Flowering period: IV - VI

Remarks: Cryptophyte; plant up to 70 cm high, densely hairy with branched stems; leaves ovate to oblong, 5–7 × 3–4 cm, nearly glabrous, ciliate on margins, sessile with obtuse apex, green-purplish; flowers in terminal cymes, involucral leaves 4–5 × 3–4 cm; capsule ovoid-globose 8 × 10 mm, seeds ovoid, compressed.

868. Euphorbia helioscopia L.

Synonyms: Tithymalus helioscopia (L.) Prokh.



Phytogeographical element: Plurireg

Habitat: Ruderal, fields Elevational range: 600 - 1100 Flowering period: IV - VII

Remarks: Therophyte; plant 10-35(-50) cm high; glands

elliptic, without horns.















869. Euphorbia inderiensis Less. ex Kar. & Kir.

Synonyms: Tithymalus inderiensis (Less.) Prokh.



Phytogeographical element: I-T

Habitat: Steppes, thermophilous shrubs

Elevational range: 400 - 2700

Flowering period: IV

Remarks: Therophyte; plant up to 25 cm high; glands with

horns, seeds 6-angular; ray-leaves linear.

870. Euphorbia jaxartica Prokh.

Synonyms: Euphorbia virgata Waldst. & Kit. subsp. jaxartica (Prokh.) Prokh., Tithymalus jaxarticus Prokh.



Phytogeographical element: I-T

Habitat: Steppes

Elevational range: 350 - 2500 Flowering period: V - VII

Remarks: Cryptophyte; plant 60–100 cm high; stems at the base pubescent; leaves linear, thick, leathery, straight;

glands with horns; seeds glabrous.

871. Euphorbia kanaorica Boiss.

Synonyms: Euphorbia polytimetica Prokh., Tithymalus polytimeticus Prokh.



Phytogeographical element: E, I-T

Habitat: Screes, moraines and snow-beds

Elevational range: 2500 - 3900

Flowering period: VI

Remarks: Cryptophyte; plant 5–25 cm high; stems wavy, thin, fragile; leaves 1–1.5 cm long, obovate or spatulate, with blurred veins; seeds 2.5–3 mm long, blurred 6-sided.

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Euphorbiaceae

872. Euphorbia maculata L.

Synonyms: Chamaesyce maculata (L.) Small.



Phytogeographical element: Plurireg

Habitat: Ruderal, fields Elevational range: 350 - 900 Flowering period: V - VII

Remarks: Therophyte; plant 10–30 cm; leaf blade long elliptic; male flowers 4 or 5, slightly exserted, female flower exserted from involucre; ovary pilose; seeds ovoid-

tetragonal.

873. Euphorbia pamirica (Prokh.) Prokh.

Synonyms: Tithymalus pamiricus Prokh.



Phytogeographical element: I-T Habitat: Alpine steppes, xeric shrubs Elevational range: 2300 - 4100 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 40–60 cm high; stem-leaves not more than 4 mm wide, narrow, linear, filiform.

874. Euphorbia sarawschanica Regel

Synonyms: Tithymalus sarawschanicus (Regel) Prokh.



Phytogeographical element: I-T

Habitat: Forbs

Elevational range: 2000 - 4000 Flowering period: V - VI

Remarks: Cryptophyte; plant 15–30(–50) cm high; leaves entire, well preserved; capsule villous with a short pedicel; cyathia on 5(–6)-ray umbelliferous inflorescence; glands

without horns.



















875. Euphorbia sogdiana Popov

Synonyms: Tithymalus sogdiana (Popov) Prokh.



Phytogeographical element: E, I-T

Habitat: Broad-leaved forests, thermophilous shrubs, forbs

Elevational range: 600 - 2100 Flowering period: V - VII

Remarks: Cryptophyte; plant up to 50 cm high; stem straight, strong; leaves 1.5–5 cm long, elliptical or oblong, with 3–5 veins; seeds 3.5–4.5 mm in diameter, 4-sided,

rounded.

876. Euphorbia szovitsii Fisch. & C.A. Mey.

Synonyms: Tithymalus szovitsii (Fisch. & C.A. Mey.) Prokh.



Phytogeographical element: I-T

Habitat: Steppes, thermophilous shrubs Elevational range: 1300 - 3400

Flowering period: IV - V

Remarks: Therophyte; plant annual, 5–20 cm high; glands with horns; seeds 4-angular; upper ray-leaves linear-

spatulate, usually bending.

877. Euphorbia tranzschelii (Prokh.) Prokh.

Synonyms: Tithymalus tranzschelii Prokh.



Phytogeographical element: I-T Habitat: Alpine steppes Elevational range: 2300 - 3400 Flowering period: VI - VIII

Remarks: Cryptophyte; plant (5–) 10–15 cm high; leaves margins serrate; ray-leaves oblong-ovate; capsule 4–5 mm

long, glabrous; seeds 3–3.5 mm long, gray.

878. Ricinus communis L.



Phytogeographical element: A, Plurireg

Habitat: River beds, ruderal Elevational range: 350 - 700 Flowering period: VII - X

Remarks: Therophyte; plant 2-5 m high; erect, often single-stemmed but sometimes bushlike or treelike; younger parts glaucous, whole plant often reddish or purplish; leaf blade palmately 7–11-lobed; inflorescence

up to 30 cm long. Usefulness: Med, Ind.

879. Albizia julibrissin Durazz.



Phytogeographical element: A, I-T, EI-T Habitat: orchards and gardens, ruderal

Elevational range: 500 - 1600 Flowering period: V - VII

Remarks: Megaphanerophyte; Deciduous tree up to 16 m high; crown open; leaflets 10–30 pairs, $6-12 \times 1-4$ mm; panicles terminal; flowers pink; calyx tubiform, ca. 3 mm, pubescent; corolla ca. 8 mm; filaments pink, ca. 2.5 cm.

880. Alhagi kirghisorum Schrenk

Synonyms: Alhagi maurorum

Medik. subsp. kirghisorum (Schrenk) Yakovlev, A. sparsifolia

Shap. ex Keller & Shap.



Phytogeographical element: I-T

Habitat: River beds, fields, salt shrubs, salt marshes

Elevational range: 700 - 1600 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 80-90 cm high; calyx

glabrous with acute teeth.

















881. Astracantha chodsha-bakirganica (B.M. Kom.) Czerep.

Synonyms: Astragalus chodsha-bakirganicus B. Kom., Tragacantha chodsha-bakirganica (B. Kom.) Rassulova



Phytogeographical element: E, I-T

Habitat: Screes

Elevational range: 400 - 600 Flowering period: V - VI

Remarks: Nanophanerophyte; shrub 40-50 cm high; calyx

teeth longer than tube; standard 1.5–1.7 cm.

882. Astracantha dissecta (B. Fedtsch. & N.A. Ivanova) Podl.

Synonyms: Astragalus dissectus B. Fedtsch. & Ivanova, A. proximus (Boriss.) Boriss., Tragacantha dissecta (B. Fedtsch. & Ivanova) Boriss.



Phytogeographical element: E, I-T

Habitat: Rocks, screes

Elevational range: 1100 - 2200

Flowering period: VI

Remarks: Nanophanerophyte; shrub 20–50 cm high; standard 0.8–1.1 cm, not emarginate on apex; calyx

5-8 mm; leaves with 5-8 pairs of leaflets.

883. Astragalus aksuensis Bunge



Phytogeographical element: I-T Habitat: Meadows, forbs Elevational range: 1800 - 3500 Flowering period: VI - VIII

Remarks: Cryptophyte; plants 45–100 cm high; leaves 8–12 cm, stipules 10–18 mm, ciliate, leaflets in 3–4 pairs, narrowly ovate, 2-6 × 0.5-1.8 cm, glabrous on both surfaces; racemes many flowered, 1-sided, 6–16 cm; calyx

shortly tubular 6-8 mm.

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884. Astragalus alitschuri O. Fedtsch.

Synonyms: Astragalus enantiotrichus Freyn



Phytogeographical element: EI-T

Habitat: Alpine semi-deserts, alpine steppes, moraines and

snow-beds

Elevational range: 3300 - 4300 Flowering period: VI - VIII

Remarks: Cryptophyte; plant (8-)10-20 cm high; stem reduced, the short branches forming mats, pubescent; leaflets $4-9 \times 3-6$ mm; calyx 12-13 mm long with black

or black and white hairs; corolla yellow.

Usefulness: For.

885. Astragalus alopecias Pall.

Synonyms: Astragalus leucospermus Bunge



Phytogeographical element: I-T Habitat: Fields, steppes Elevational range: 700 - 1700 Flowering period: V - VI

Remarks: Cryptophyte; plant 40–90 cm high; inflorescences cylindric 5–15 cm long, sessile or on

peduncles 0.5-4 cm long.

886. Astragalus alpinus L.



Phytogeographical element: I-T, E-S

Habitat: Alpine meadows Elevational range: 1700 - 4000 Flowering period: VI - VII

Remarks: Cryptophyte; plant up to 20 cm high; leaves 2-8 cm, hairy, leaflets in 7-12 pairs, narrowly elliptic, $5-15(-20) \times 2-5(-7)$ mm; legumes nodding, with a stipe 2-5 mm, ellipsoid, 7-13 mm, 3-3.5 mm wide, keeled

ventrally.

























887. Astragalus auratus Gontsch.



Phytogeographical element: E, I-T

Habitat: Screes

Elevational range: 1650 - 1700 Flowering period: VI - VII

Remarks: Cryptophyte; plant 10–25 cm high; stem 1–2 cm long or lacking; leaves with 1–2 pairs of leaflets; silique

1.2–1.4 cm long.

888. Astragalus babatagii Popov



Phytogeographical element: I-T

Habitat: Steppes, xeric shrubs, thermophilous shrubs

Elevational range: 700 - 2350 Flowering period: IV - VI

Remarks: Chamaephyte; plant 10–30 cm high; calyx tubular–campanulate; standard 0.9–1.2 cm, wings almost

equal to standard; fruit 8-seeded.

889. Astragalus beketowi (Krasn.) B. Fedtsch.

Synonyms: Astragalus polychromis Freyn, Oxytropis beketovii Krassn.



Phytogeographical element: EI-T

Habitat: Screes

Elevational range: 3800 - 4850

Flowering period: VII

Remarks: Cryptophyte; plant 5–15(–20) cm high; leaves with 5–7 pairs of leaflets; calyx 5–10 mm; standard 1.5–1.8 mm; wings shorter than standard; fruits strongly

inflated, marble-spotted.

890. Astragalus borodinii Krasnov



Phytogeographical element: EI-T Habitat: Semi-deserts, alpine steppes Elevational range: 1900 - 4500 Flowering period: VI - VIII

Remarks: Cryptophyte; leaves 2–5 cm; leaflets mostly in 2 pairs, obovate, $8-20 \times 3-8$ mm; stipules 8-10 mm, densely covered with subappressed, subbasifixed to basifixed hairs, at margins ciliate; calyx 11-13 mm, densely villous, hairs up to 2 mm; teeth 2.5-4 mm.

891. Astragalus breviscapus B. Fedtsch.

Synonyms: Astragalus oophorus Freyn



Phytogeographical element: I-T Habitat: Screes, alpine steppes Elevational range: 2500 - 4100 Flowering period: V - VI

Remarks: Cryptophyte; plant 6–12 cm high; stipule 5–6 mm with white hairs; inflorescence peduncles

1–2.5 cm long. Usefulness: For.

892. Astragalus campylorhynchus Fisch. & C.A. Mey.



Phytogeographical element: I-T

Habitat: River beds, semi-deserts, fields, steppes

Elevational range: 400 - 3000 Flowering period: III - VII

Remarks: Therophyte; plant 6-40 cm high; siliques

3–4.5 cm long, smooth, erected.

Usefulness: For.















893. Astragalus charguschanus Freyn

Synonyms: Astragalus pamiricus B. Fedtsch.



Phytogeographical element: I-T Habitat: Screes, alpine semi-deserts Elevational range: 3300 - 4900 Flowering period: VI - VII

Remarks: Cryptophyte; plant 4–15 cm high; leaves with 8–15 pairs of leaflets; peduncles glabrous; calyx teeth

6-8 mm; standard 1.7-2.4 cm.

Usefulness: For.

894. Astragalus chomutowii B. Fedtsch.



Phytogeographical element: EI-T

Habitat: Alpine semi-deserts, alpine steppes

Elevational range: 3600 - 4100 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 3–7 cm high; leaves 1–3 cm long; fruits sessile with white hairs, oblong, strongly

inflated. Usefulness: For.

895. Astragalus coluteocarpus Boiss.



Phytogeographical element: I-T

Habitat: Juniper forests, steppes, xeric shrubs,

thermophilous shrubs Elevational range: 800 - 3500 Flowering period: VI - VII

Remarks: Cryptophyte; plant 40–110 cm high; stipules white membranous; leaves with 5–7 pair of leaflets; calyx

teeth 1.5-2 times shorter than tube.

896. Astragalus cystocarpus Boriss.



Phytogeographical element: E, EI-T

Habitat: Forbs

Elevational range: 2600 - 3000 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 25–70 cm high; leaves with 10–15 leaflet pairs; stipules 1.5–2 cm long; flower pedicel

4–5 mm long.

897. Astragalus darwasicus Basil.



Phytogeographical element: E, I-T

Habitat: Screes

Elevational range: 1900 - 2100

Flowering period: VI

Remarks: Cryptophyte; plant 35–45 cm high; leaves with 6–8 leaflet pairs; stipule 1–1.5 cm long; flower pedicel

1–3 mm long.

898. Astragalus dignus Boriss.



Phytogeographical element: I-T Habitat: Screes, alpine steppes, sands Elevational range: 2400 - 4300

Flowering period: VI - VII

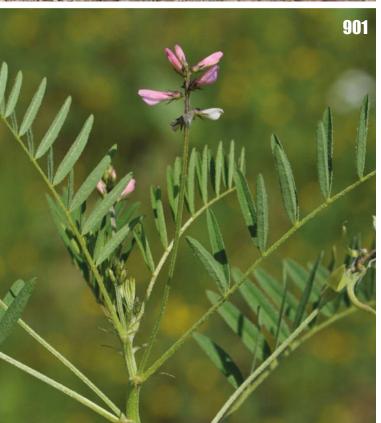
Remarks: Cryptophyte; plant 18–22 cm high; leaflets 4–8 × 0.2–0.3 cm; calyx 1.2–1.5 cm long; wings bifurcated on

top; keel wide-ovate.









899. Astragalus dipelta Bunge

Synonyms: *Didymopelta turkestanica* Regel & Schmalh., *Dipelta turkestancia* Regel & Schmalh.



Phytogeographical element: I-T

Habitat: Fields, steppes, thermophilous shrubs

Elevational range: 850 - 2900 Flowering period: V - VI

Remarks: Therophyte; plant 8–30 cm high; stipule fused to petiole only at base; petal pale violet or azur; loose racemes with 3–11 flowers; calyx bell-shaped with black and white hairs, teeth equal to tube; legumes sessile, pubescent.

900. Astragalus ferganensis (Popov) A.S. Korol.

Synonyms: Astragalus erioceras Ledeb. var. ferganensis Popov



Phytogeographical element: I-T Habitat: Semi-deserts, steppes Elevational range: 450 - 1300 Flowering period: III - IV

Remarks: Cryptophyte; plant 5–20 cm high; leaflets 0.6–1.4 cm long, circular, oval–circular, elliptic or oblong; calyx 1.7–1.8 cm long; fruits 2.2–2.5 cm long, white–lanate.

901. Astragalus filicaulis Kar. & Kir.

Synonyms: Astragalus leptodermus Bunge, Oxyglottis filicaulis (Fisch. & C.A. Mey.) Nevski



Phytogeographical element: I-T

Habitat: Steppes

Elevational range: 1200 - 2800

Flowering period: IV - V

Remarks: Therophyte; plant 5–50 cm high; stems, petiole, and rachis closely appressed hairy; calyx 3–4 mm; fruit 6–10 mm with wrinkled walls, covered with short

subappressed spreading hairs.

Usefulness: For.

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Fabaceae

902. Astragalus globiceps Bunge

Synonyms: Astragalus czuiliensis Golosk., A. flavicomus Bunge, A. jakkabagi Lipsky, A. timuranus Franch.



Phytogeographical element: I-T

Habitat: Juniper forests, steppes, xeric shrubs,

thermophilous shrubs

Elevational range: 1100 - 2400 Flowering period: V - VI

Remarks: Cryptophyte; plant 40–65 cm high; corolla glabrous; inflorescence with 3–8 cm long pedicels.

903. Astragalus heterodontus Boriss.



Phytogeographical element: EI-T

Habitat: Fens and mires, moraines and snow-beds

Elevational range: 3800 - 4300 Flowering period: VII - VIII

Remarks: Chamaephyte; plant up to 30 cm high; stems loosely covered with very short appressed hairs; petals intensely violet; fruit cross–wrinkled, covered with

spreading white and black hairs.

904. Astragalus kabadianus Lipsky

Synonyms: Astragalus cisdarvasicus Gontsch.



Phytogeographical element: I-T

Habitat: Broad-leaved forests, steppes, thermophilous shrubs

Elevational range: 580 - 1800

Flowering period: V

Remarks: Chamaephyte; plant 40–95 cm high; calyx 0.9-1.1 cm long with 2 mm teeth; standard 1.5-1.8 long; fruit $2.5-4\times0.1-0.2$ cm, gradually narrowing to beak.



















905. Astragalus korovinianus Barneby

Synonyms: Astragalus grandiflorus Bunge



Phytogeographical element: I-T

Habitat: Steppes, thermophilous shrubs

Elevational range: 500 - 1500 Flowering period: IV - VI

Remarks: Cryptophyte; plant 8–30 cm high; leaves with 10–14(–17) pairs of leaflets; petioles white and golden-yellowish; standard pubescent; petals yellow during

blooming. Usefulness: For.

906. Astragalus krauseanus Regel

Synonyms: Astragalus xanthomelas Bunge



Phytogeographical element: E, I-T

Habitat: Screes

Elevational range: 800 - 1600 Flowering period: VI - VII

Remarks: Cryptophyte; plant 20–50 cm high; stem 10–30 cm high; leaves with 3–6 pairs of leaflets; siliques

6-8 mm long.

907. Astragalus kulabensis Lipsky



Phytogeographical element: I-T

Habitat: Juniper forests, steppes, xeric shrubs,

thermophilous shrubs, forbs Elevational range: 850 - 2000 Flowering period: V - VII

Remarks: Cryptophyte; plant 50–100 cm high; stipule 0.6–1 cm long; inflorescence spherical or elliptical, sessile

or on peduncle 1–1.5 cm long; calyx wide tubular.

908. Astragalus lancifolius Gontsch.



Phytogeographical element: E, I-T Habitat: Steppes, thermophilous shrubs

Elevational range: 700 - 1700

Flowering period: IV

Remarks: Cryptophyte; plant 30–50 cm high; leaves 5–14 cm long with 2–7 pairs of leaflets; stipules 3–7 mm

long; inflorescence with 4–9 yellow flowers.

909. Astragalus lasiosemius Boiss.

Synonyms: Astragalus aridus Freyn, A. latistylus Freyn



Phytogeographical element: I-T Habitat: Steppes, xeric shrubs, forbs Elevational range: 1700 - 3800 Flowering period: VI - VII

Remarks: Chamaephyte; plant 10–25 cm high; stems of current year 2–8(–15) cm, hairy, glabrescent with age,

internodes 1–1.5 cm; peduncle 0.1–2.5 cm.

910. Astragalus longistipitatus Boriss.



Phytogeographical element: E, EI-T Habitat: Loose sandy screes, screes Elevational range: 2200 - 2800 Flowering period: V - VII

Remarks: Cryptophyte; plant 26–65 cm high; leaves 10–25 cm long with 8–13 pairs of leaflets; petals 0.7–1 mm

long, hairy, violet.











911. Astragalus macropterus DC.



Phytogeographical element: I-T, E-S

Habitat: Screes, forbs

Elevational range: 1600 - 3900 Flowering period: VI - VIII

Remarks: Cryptophyte; plant up to 90 cm high; leaflets slightly more than 2 as long as wide; petals purple or yellowish with purple keel; standard 9–11 mm, rounded

or retuse; fruits sessile 7–9 mm, glabrous.

Usefulness: For.

912. Astragalus mucidus Bunge



Phytogeographical element: SE, I-T

Habitat: Juniper forests, steppes, xeric shrubs, forbs

Elevational range: 640 - 1700 Flowering period: IV - VI

Remarks: Cryptophyte; plant 9–30 cm high; stem 0.6–13 cm long; leaves 9–15 cm long, imparipinnate, with 14–26 pairs of leaflets; calyx with white hairs; peduncle

2–3 cm long. Usefulness: For.

913. Astragalus nematodes Boiss.



Phytogeographical element: E, I-T Habitat: River beds, screes, steppes Elevational range: 500 - 2000 Flowering period: III - V

Remarks: Cryptophyte; plant 10–15(–20) cm high; leaflets narrowly linear; flowers red; silique with 6–8 seeds.

914. Astragalus nivalis Kar. & Kir.

Synonyms: Astragalus nathaliae Meff., A. orthanthoides Boriss., A. orthanthus Freyn



Phytogeographical element: EI-T Habitat: Screes, moraines and snow-beds

Elevational range: 3700 - 5000 Flowering period: VI - VII

Remarks: Cryptophyte; plant 8–25 cm high; sparsely caespitose, covered with mostly medifixed hairs; calyx

inflated, spherical to ovoid.

Usefulness: For.

915. Astragalus nuciferus Bunge



Phytogeographical element: SE, I-T

Habitat: Juniper forests, loose sandy screes, screes

Elevational range: 1000 - 3000 Flowering period: IV - V

Remarks: Cryptophyte; plant 37–90 cm high; leaves with 5–10 pairs of leaflets; siliques 3.5–6 cm long, swollen.

916. Astragalus ophiocarpus Boiss.

Synonyms: Astragalus paulsenii Freyn, A. vernicularis Hausskn. & Bornm., Ophiocarpus paulsenii (Freyn) Ikonn., Trigonella komarovii Lipsky



Phytogeographical element: I-T, S-S

Habitat: Riverside forests, fields, steppes, thermophilous

shrubs, forbs

Elevational range: 300 - 3800 Flowering period: IV - VI

Remarks: Therophyte; plant 5–40 cm high; stipule pubescent, partially fused with petiole; leaves with 5–8

pairs of leaflets. Usefulness: For.















917. Astragalus ovczinnikovii Boriss.



Phytogeographical element: EI-T

Habitat: Screes

Elevational range: 2400 - 2500 Flowering period: V - VI

Remarks: Cryptophyte; plant 25–37 cm high, stemless; leaves with 18–25 pairs of leaflets; flowers yellowish-

purple.

918. Astragalus oxyglottis M. Bieb.



Phytogeographical element: I-T, E-S

Habitat: Steppes

Elevational range: 350 - 1200 Flowering period: III - V

Remarks: Therophyte; plant 17–25 cm high; inflorescence less than 5 cm long, with 3–6-flowered clusters; fruit

without grooves. Usefulness: For.

919. Astragalus pseudorhacodes Gontsch.



Phytogeographical element: E, I-T

Habitat: Steppes

Elevational range: 750 - 900 Flowering period: VI

Remarks: Cryptophyte; plant 20–30 cm high; leaves with 1–3 pairs of leaflets; fruits 2–2.6 cm long, with 10–12

seeds, linear.

920. Astragalus quisqualis Bunge



Phytogeographical element: E, I-T Habitat: Broad-leaved forests, screes Elevational range: 1300 - 2200 Flowering period: VI - VII

Remarks: Cryptophyte; plant up to 95 cm high; shoot thick; peduncle 25 cm long, glabrous; inflorescence with 10–20 flowers

or more; calyx tubular; standard 1.8–2.1 cm long.

Usefulness: For, Foo.

921. Astragalus retamocarpus Boiss.



Phytogeographical element: I-T

Habitat: Broad-leaved forests, steppes, thermophilous shrubs,

forbs

Elevational range: 900 - 2000 Flowering period: IV - V

Remarks: Cryptophyte; plant 50–100 cm high, pubescent with long white and short black hairs; leaf compound, ca. 10–20 cm long, leaflets ca. 31–61; fruit 7–10 mm long, glabrous, 2-seeded.

Usefulness: For.

922. Astragalus rytilobus Bunge



Phytogeographical element: I-T

Habitat: Meadows, fields, steppes, thermophilous shrubs

Elevational range: 400 - 2500

Flowering period: V

Remarks: Therophyte; plant 5–40(–70–80) cm high; stipule triangular, acute; flower bracts with black hairs; calyx 4–5 mm

long; legumes ovoid. Usefulness: For.





















923. Astragalus saratagius Bunge



Phytogeographical element: E, I-T Habitat: Juniper forests, alpine steppes

Elevational range: 2200 - 2300 Flowering period: VIII

Remarks: Cryptophyte; plant up to 27 cm high; calyx teeth $2-5 \times$ shorter than tube; stipule pubescent, scarious.

924. Astragalus sericeopuberulus Boriss.



Phytogeographical element: I-T Habitat: Juniper forests, screes Elevational range: 2500 -3550 Flowering period: V - VI

Remarks: Cryptophyte; plant 7–20 cm high; acaulescent; leaves with 16–21 pairs of leaflets; pedicel 2–4 mm long,

glabrous; calyx 1.5–2.1 cm long.

925. Astragalus schachdarinus Lipsky



Phytogeographical element: EI-T Habitat: Riverside forests, steppes Elevational range: 1800 - 4200 Flowering period: VI - VII

Remarks: Cryptophyte; plant 20–40 cm high with short stem or stemless; leaves 5–9 cm long with 3–4 pairs of lanceolate or linear-lanceolate leaflets; flowers pale violet;

fruits with 4 seeds.

926. Astragalus scheremetevianus B. Fedtsch.

Synonyms: Astragalus lipskyanus Freyn



Phytogeographical element: EI-T

Habitat: River beds, steppes, xeric shrubs

Elevational range: 2700 - 4300 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 30-60 cm high; bracts 3–5 mm long; calyx with short teeth; flower yellow.

Usefulness: For.

927. Astragalus schmalhausenii Bunge

Synonyms: Sewerzowia turkestanica Regel & Schmalh.



Phytogeographical element: I-T

Habitat: Steppes, xeric shrubs, thermophilous shrubs,

Elevational range: 400 - 2100 Flowering period: IV - V

Remarks: Therophyte; plant 30--70 cm high; stem with white and black trichomes; flowers whitish, only at the top with violet spot; fruits with long trichomes (or rarely with small tubercles) on sides and at the edge.

Usefulness: For.

928. Astragalus sieversianus Pall.



Phytogeographical element: I-T

Habitat: Ruderal, xeric shrubs, thermophilous shrubs,

Elevational range: 1000 - 2500 Flowering period: V - VI

Remarks: Cryptophyte; plant 60-150 cm high; calyx 20-22 mm, densely hairy, teeth 8-10 mm; standard widely ovate, $34-39 \times 17-21$ mm, apex deeply emarginate; wings 28-34 mm; keel 27-31 mm; legumes 15-20 mm, ca.

15 mm in diameter with a beak ca. 3 mm.

Usefulness: For, Foo.





















929. Astragalus skorniakowi B. Fedtsch.



Phytogeographical element: I-T Habitat: Alpine swards, alpine steppes Elevational range: 2000 - 4000 Flowering period: V - VI

Remarks: Cryptophyte; plant 10–30 cm high; ovary anf

fruits glabrous; fruits swollen.

Usefulness: For.

930. Astragalus spinescens Bunge



Phytogeographical element: I-T

Habitat: Steppes

Elevational range: 500 - 1200 Flowering period: IV - V

Remarks: Chamaephyte; plant 15–30 cm high; leaflets glabrous on top; fruits 2-seeded with beak turned into a

thorn; flowers yellow.

931. Astragalus taschkendicus Bunge



Phytogeographical element: I-T

Habitat: Juniper forests, steppes, xeric shrubs

Elevational range: 800 - 2300 Flowering period: IV - V

Remarks: Cryptophyte; plant 20–50 cm high; leaflets oblong-ovate to elliptic; stipule 0.8–1.8 cm long; peduncle

with white hairs; petals dark purple.

932. Astragalus tecti-mundi Freyn



Phytogeographical element: I-T

Habitat: Riverside forests, fens and mires, springs

Elevational range: 2400 - 3600 Flowering period: VI - VIII

Remarks: Cryptophyte; plant up to 95 cm high; stipule grassy-shaped; peduncle glabrous; standard 2–2.3 mm long; fruits 2.5–4.5 cm, covered with black hairs, slightly

grooved dorsally. Usefulness: For.

933. Astragalus thlaspi Lipsky

Synonyms: Thlaspidium thlaspi (Lipskyi) Rassulova



Phytogeographical element: E, I-T Habitat: Steppes, thermophilous shrubs

Elevational range: 800 - 1800

Flowering period: IV

Remarks: Therophyte; plant 10–20 cm high; leaves 4–6 cm long, with 4–5 pairs of leaflets; leaflets 6–10 mm long, obovate or oblong-elliptic; calyx with black hairs; raceme 2–6-flowered; legume broad, $2.5–3\times1.5$ cm, 2–4-seeded.

934. Astragalus tibetanus Bunge

Synonyms: Astragalus talievii Sirj.



Phytogeographical element: I-T

Habitat: Riverside forests, alpine meadows

Elevational range: 1600 - 3800 Flowering period: V - IX

Remarks: Cryptophyte; plant 4–35 cm high, standard 16–22 mm; wing limbs distinctly obliquely emarginate; calyx teeth distinctly shorter than tube; legumes covered

with predominantly black hairs.

Usefulness: For.























935. Astragalus trachycarpus Gontsch.



Phytogeographical element: E, I-T

Habitat: Steppes

Elevational range: 800 - 2900 Flowering period: V - VI

Remarks: Cryptophyte; plant 30–60 cm high, white pubescent; calyx tubular, teeth 2–3.5 × shorter than calyx

tube; standard 3–4 cm long.

936. Astragalus tribuloides Delile

Synonyms: Oxyglottis tribuloides (Delile) Nevski



Phytogeographical element: I-T

Habitat: River beds, semi-deserts, steppes

Elevational range: 400 - 2700 Flowering period: III - V

Remarks: Therophyte; plant up to 40 cm high, with appressed to ascending white hairs 0.2–1.5 mm; calyx 3–5 mm; leaflets on both surfaces densely appressed hairy; legumes at base distinctly bigibbous.

Usefulness: For.

937. Astragalus viridiflorus Boriss.



Phytogeographical element: E, I-T

Habitat: Fields, steppes, thermophilous shrubs

Elevational range: 800 - 1600 Flowering period: V - VII

Remarks: Cryptophyte; plant 15–30 cm high; bracts with white and black hairs; calyx tubular; flowers 4–5.5 cm

long.

938. Astragalus wachschi B. Fedtsch.



Phytogeographical element: E, I-T Habitat: Thermophilous shrubs Elevational range: 570 - 1300 Flowering period: III - IV

Remarks: Nanophanerophyte; plant up to 1 m high, with

spines; inflorescence with 3–5 flowers.

939. Calophaca grandiflora Regel



Phytogeographical element: E, I-T Habitat: Thermophilous shrubs Elevational range: 950 - 2100 Flowering period: V - VI

Remarks: Nanophanerophyte; plant up to 1.5 m high;

leaflets 1–2.6 cm long; calyx 1.2–1.5 cm long.

 $Usefulness:\ Orn.$

940. Caragana acanthophylla Kom.



Phytogeographical element: I-T

Habitat: Steppes

Elevational range: 1350 - 1600

Flowering period: IV - V

Remarks: Nanophanerophyte; plant up to 1.5 m high; leaves 1–2 cm long, paripinnate with 2–4 pairs of leaflets;

leaf petioles turn into thorns.

Usefulness: Orn.



















941. Caragana alaica Pojark.



Phytogeographical element: E, I-T

Habitat: Xeric shrubs

Elevational range: 1600 - 1900

Flowering period: V

Remarks: Nanophanerophyte; plant 1–3 m high; leaves imparipinnate with 5–7 leaflets; fruits 2.5–3 cm long.

Usefulness: Orn.

942. Caragana jubata (Pall.) Poir.

Synonyms: Robinia jubata Pall.



Phytogeographical element: EI-T, Arctic, E-S

Habitat: Screes, forbs

Elevational range: 2600 - 3700 Flowering period: VI - VII

Remarks: Nanophanerophyte; plant 1–3 m high; leaves pinnate, 8–12-foliolate; leaflet blades oblong, 11–15 × 4–6 mm, base rounded, apex rounded to acute; calyx tube tubular, 1.4–1.7 cm; corolla white or pink, 2.5–3.9 cm; ovary villous; legume to 3 cm, densely villous.

Usefulness: Orn.

943. Caragana turfanensis (Krasn.) Kom.

Synonyms: Caragana laeta Kom.



Phytogeographical element: EI-T Habitat: Semi-deserts, steppes, screes Elevational range: 800 - 1900

Flowering period: V - VII

Remarks: Nanophanerophyte; shrubs to 1 m high; branches yellowish brown; leaves digitate, 4-foliolate; petiole 0.7–1.3 cm; leaflet blades obovate 4– 6×2 –3 mm with acute apex; corolla yellow, standard obovate,

1.7–2.2 cm; legume 3–4.5 cm 4–6 mm.

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944. Cercis griffithii Boiss.



Phytogeographical element: I-T

Habitat: Xeric shrubs, thermophilous shrubs

Elevational range: 300 - 2200 Flowering period: III - IV

Remarks: Megaphanerophyte; plant up to 5 m high; flowers purple-violet; siliqua with 3–5 mm wide wings.

Usefulness: Orn.

945. Chesneya badachschanica Boriss.



Phytogeographical element: E, EI-T Habitat: Loose sandy screes, screes Elevational range: 3100 - 4100

Flowering period: VII

Remarks: Cryptophyte; plant 5–10 cm high; pedicel ca. 1 mm long; flowers up to 2 cm long; calyx 0.9–1 mm long.

946. Chesneya crassipes Boriss.



Phytogeographical element: E, I-T Habitat: Loose sandy screes, screes Elevational range: 1400 - 3050 Flowering period: V - VI

Remarks: Cryptophyte; plant 5–7 (–12) cm high; leaves pinnate with 5–7 pairs of leaflets; flower peduncles

1.5–4 mm; calyx 1.2–1.5 cm long.















947. Chesneya ferganensis Korsh.

Synonyms: Chesniella ferganensis (Korsh.) Boriss.



Phytogeographical element: I-T

Habitat: Screes

Elevational range: 700 - 2100 Flowering period: IV - VI

Remarks: Cryptophyte; plant 10–20 cm high with deep tap roots, procumbent; leaves 1–2.5 cm long with 2–4 pairs of leaflets, pubescent; flowers with campanulate 6–10 mm calyx; corolla rose–purple, 2 × longer than calyx, keel shorter than wings; legume oblong 12–17 mm, densely tomentose, seeds 2–3 reniform.

948. Chesneya gracilis (Boriss.) R. Kam.

Synonyms: Chesniella gracilis Boriss.



Phytogeographical element: E, I-T

Habitat: Screes

Elevational range: 500 - 1100 Flowering period: IV - VI

Remarks: Cryptophyte; plant prcumbent, pubescent, with stems up to 10 cm; leaves 1.5–2.2 cm long with 2–4 pairs of leaflets; pedicels 4–9 mm; flowers solitary; calyx 5–7 mm; corolla yellow, brownish, standard 1.3–1.7 cm; legume oblong 1.5–2 cm, densely pubescent; seeds 3–4 reniform, ca. 3 mm long.

949. Chesneya ternata (Korsh.) Popov

Synonyms: Kostyczewa ternata Korsh.



Phytogeographical element: SE, I-T Habitat: Loose sandy screes, screes Elevational range: 1000 - 2400

Flowering period: III - V

Remarks: Cryptophyte; plant 5–7(–15) cm high; leaves with 3 leaflets; calyx with white and black hairs.

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950. Chesneya turkestanica Franch.



Phytogeographical element: E, I-T

Habitat: River beds, loose sandy screes, screes

Elevational range: 1600 - 3900 Flowering period: V - VII

Remarks: Cryptophyte; plant 7–12 cm high; leaves with 4–5 pairs of leaflets; calyx 3–3.5 cm long; flowers yellow.

951. Cicer baldshuanicum (Popov) Lincz.

Synonyms: Cicer flexuosum
Lipsky subsp. baldshuanicum Popov



Phytogeographical element: E, I-T

Habitat: Steppes, forbs Elevational range: 1450 - 2700 Flowering period: IV - VI

Remarks: Cryptophyte; plant 30–70 cm high; standard pubescent; leaflets glabrous on top; calyx up to 4 mm

long.

952. Cicer fedtschenkoi Lincz.

Synonyms: Cicer songaricum DC. var. schugnanicum Popov



Phytogeographical element: E, EI-T

Habitat: River beds, rocks, screes, alpine steppes

Elevational range: 2700 - 4450 Flowering period: VI - VII

Remarks: Cryptophyte; plant 20-35 cm high; standard

glabrous; peducle ended with a leaflet.

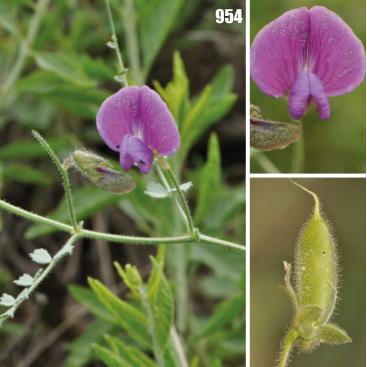














953. Cicer macracanthum Popov



Phytogeographical element: I-T Habitat: Screes, steppes Elevational range: 2400 - 3800 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 16–42 cm high; leaves with spicule at apex; calyx with wide, triangular teeth.

Usefulness: For.

954. Cicer mogoltavicum (Popov) A.S. Korol.



Phytogeographical element: E, I-T

Habitat: Rocks, loose sandy screes, screes, steppes

Elevational range: 900 - 1900 Flowering period: IV - VI

Remarks: Cryptophyte; plant 33–80 cm high; leaves with 6–10 pairs of leaflets, glandular; standard pubescent; calyx

7–15 mm long.

955. Cicer pungens Boiss.

Synonyms: Cicer spinosum Popov



Phytogeographical element: E, I-T

Habitat: Loose sandy screes, screes, steppes

Elevational range: 1800 - 2800 Flowering period: VI - VII

Remarks: Cryptophyte; plant 15-35 cm high; leaves with

spicule at apex; stipule 2-7 mm, leaf-shaped.

956. Cicer songaricum DC.



Phytogeographical element: I-T, E-S

Habitat: Broad-leaved forests, xeric shrubs, forbs

Elevational range: 2000 - 4100 Flowering period: V - VII

Remarks: Cryptophyte; plant 13–70 cm high; leaves with 6–10 pairs of leaflets, 0.7–1.1 cm long, glandular; standard

pubescent; calyx 1–1.5 cm long.

Usefulness: For.

957. Colutea paulsenii Freyn

Synonyms: Colutea canescens Shap., C. mesantha Shap. ex Ali, C. rostrata Sumn.



Phytogeographical element: I-T

Habitat: River beds, screes, thermophilous shrubs

Elevational range: 800 - 2800 Flowering period: V - VI

Remarks: Nanophanerophyte; plant up to 2 m high; leaves with (2–)3–4 pairs of leaflets, leaflets elongate-elliptic or ovoid; inflorescens with 3–5 flowers; keel equals wings, standard 2–2.2 cm; calyx campanulate-tubular.

958. Cullen drupaceum (Bunge) C.H. Stirt.

Synonyms: Psorelea drupacea Bunge



Phytogeographical element: I-T

Habitat: Ruderal, fields, steppes, xeric shrubs,

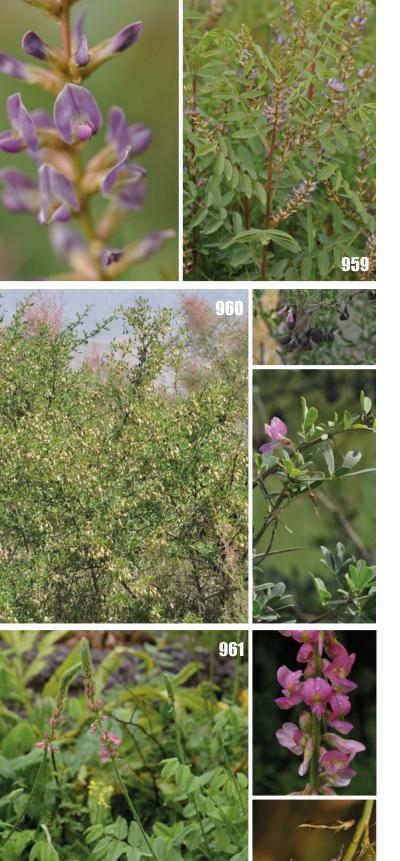
thermophilous shrubs Elevational range: 350 - 1400 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 70–130 cm high, erect; stem glandular, pilose to villous; stipules lateral, 5–15 mm long, glandular, yellow-punctate; leaf alternate, unifoliolately compound; leaflets dentate, pilose and nigro–punctate on both sides; inflorescence a panicle; calyx ca. 3.5 mm long, villous, punctate, teeth unequal, 1–1.5 mm long; fruit

villous, 4×3 mm, 1-seeded.

Usefulness: For, Ind.





959. Glycyrrhiza glabra L.

Synonyms: Glycyrrhiza glabra subsp. glandulifera (Waldst. & Kit.) Ponert, G. glandulifera Waldst. & Kit., G. hirsuta Pall.



Phytogeographical element: I-T, M

Habitat: River beds, riverside forests, ruderal, fields

Elevational range: 350 - 1600 Flowering period: V - VI

Remarks: Cryptophyte; plant 50–80(–120) cm high; calyx 5–7 mm; siliques straight or slightly bent, 2–3 cm long

and 4–6 mm wide. Usefulness: Med, For, Foo.

960. Halimodendron halodendron (Pall.) Voss

Synonyms: Robinia halodendron Pall.



Phytogeographical element: I-T, M Habitat: River beds, salt shrubs Elevational range: 300 - 2600 Flowering period: V - VIII

Remarks: Nanophanerophyte; plant up to 2 m high; bark yellowish, furrowed; rachis and stipules forms thorns;

flowers violet or pink. Usefulness: Foo, Orn.

961. Hedysarum baldshuanicum B. Fedtsch.

Synonyms: *Hedysarum chaitocarpum* Regel & Schmalh. var. *baldshuanicum* (B. Fedtsch.) B. Fedtsch



Phytogeographical element: E, I-T

Habitat: Steppes

Elevational range: 1200 - 2700 Flowering period: V - VI

Remarks: Cryptophyte; plant 30–70 cm high; leaves with 6–10 pairs of leaflets; stipules membraneous; calyx teeth longer than tube; wings and keel shorter than standard; legumes with spines; articles of siliqua with inconspicuous tubercles.

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962. Hedysarum denticulatum Regel & Schmalh.

Synonyms: Hedysarum lehmannianum var. pubescens B. Fedtsch., H. lehmannianum var. glabrescens B. Fedtsch., H. lehmannianum var. subacaules B. Fedtsch.



Phytogeographical element: I-T Habitat: Rocks, screes, fields, steppes Elevational range: 1200 - 3000

Flowering period: V - VI

Remarks: Cryptophyte; plant 25–60 cm high; leaves with 8–14 pairs of leaflets; calyx 6–7 mm, pubescent; flowers

1.6–2.5 cm long, lilac.

963. Hedysarum ferganense Korsh. var. poncinsii (Franch.) L.Z. Shue

Synonyms: *Hedysarum poncinsii* Franch., *H. pumilum* B. Fedtsch.



Phytogeographical element: E, I-T

Habitat: Alpine steppes Elevational range: 4200 - 4250 Flowering period: VI - VII

Remarks: Cryptophyte; plant 4–10 cm high; leaves with 3–4 pairs of leaflets; bracts 3–4 mm long; calyx 7–8 cm

long; flowers dark purple.

Usefulness: For.

964. Hedysarum flavescens Regel & Schmalh.



Phytogeographical element: SE, I-T Habitat: River beds, screes Elevational range: 2100 - 3200 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 25–100 cm high; leaflets at the bottom with hairs; inflorescences 6–18 cm long,

distinctly longer than leaves; flowers yellow.

Usefulness: For.

























965. Hedysarum minjanense Rech. f.

Synonyms: Hedysarum cephalotes Franch



Phytogeographical element: I-T

Habitat: River beds, alpine semi-deserts, alpine steppes

Elevational range: 2400 - 4500 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 6–20 cm high; leaves with 3–6 pairs of leaflets; bracts 6–8 mm long; calyx 1–1.5 cm

long, flowers pink or lilac. Usefulness: For, Orn.

966. Hedysarum omissum Korotkova ex Kovalevsk.

Synonyms: Hedysarum fedtschenkoanum Regel



Phytogeographical element: E, I-T

Habitat: Steppes

Elevational range: 1300 - 2800 Flowering period: VI - VII

Remarks: Cryptophyte; plant 8–23 cm high; stemless; leaves ternate, rarely with 1–2 pairs of leaflets; peduncle

5–10 cm long.

967. Lathyrus cicera L.



Phytogeographical element: I-T, M

Habitat: Fields

Elevational range: 550 - 1600 Flowering period: IV - V

Remarks: Therophyte; plant 10–80 cm high; stem and petiole narrowly winged; petiole 0.5–1.5 cm long,

standard 1–1.4 cm long.

Usefulness: For.

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968. Lathyrus inconspicuus L.



Phytogeographical element: I-T, M

Habitat: Steppes, thermophilous shrubs, forbs

Elevational range: 500 - 1700 Flowering period: IV - V

Remarks: Therophyte; plant 10–37 cm high; flowers

sessile; leaves with 2–5 mm awn at apex.

Usefulness: For.

969. Lathyrus mulkak Lipsky



Phytogeographical element: E, I-T

Habitat: Screes, moraines and snow-beds, forbs

Elevational range: 1200 - 3000 Flowering period: V - IX

Remarks: Cryptophyte; plant 65–120 cm high; leaves with

(2–)3–4 pairs of leaflets; flowers 3–4 cm long.

Usefulness: For, Orn.

970. Lathyrus pratensis L.



Phytogeographical element: I-T, E-S

Habitat: Juniper forests, broad-leaved forests, riverside

forests, forbs

Elevational range: 1100 - 3000 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 30–110 cm high; stipule

1–3.7 cm; siliques with 6–12 seeds.

Usefulness: For.









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971. Lathyrus sativus L.

Synonyms: Lathyrus asiaticus (Zalkind) Kudr., L. satirus subsp. asiaticus Zalkind



Phytogeographical element: A, Plurireg

Habitat: Fields

Elevational range: 1800 - 3000

Flowering period: VI

Remarks: Therophyte; plant 30–100 cm high; stem winged; leaflets narrowly lanceolate; peduncle 1-flowered, 3–6 cm long; calyx 7–10 mm long; calyx teeth subequal, longer than the tube; corolla blue, red or white; fruit 2.5–3.3 cm long.

Usefulness: For, Foo.

972. Lathyrus tuberosus L.



Phytogeographical element: I-T, E-S, M Habitat: Broad-leaved forests, fields, forbs

Elevational range: 1600 - 3700 Flowering period: VI - VIII

Remarks: Cryptophyte; plant up to 100 cm high; stipule

0.5–1.5 cm long; siliques with 3–6 seeds.

Usefulness: Med, For, Foo.

973. Lens culinaris Medik.



Phytogeographical element: A, Plurireg

Habitat: Fields

Elevational range: 550 - 2600 Flowering period: VI - IX

Remarks: Therophyte; plant 20–75 cm high; leaves 3–4 cm long; stipules 4–4.5 mm; flowers white or pink; ovary

ovoid; siliqua 8-10 mm wide.

Usefulness: For, Foo.

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974. Lens culinaris Medik. subsp. orientalis (Boiss.) Ponert

Synonyms: Ervum orientale Boiss., Lens orientalis (Boiss.) Schmalh.



Phytogeographical element: I-T, M

Habitat: Screes, steppes, thermophilous shrubs

Elevational range: 500 - 1700 Flowering period: IV - V

Remarks: Therophyte; plant 10-30 cm high; stipules 2-3 mm long; fruits 3.5-6.6 mm wide; flowers violet

bluish or pink with violet tint.

Usefulness: For, Foo.

975. Lotus krylovii Schischkin & Serg.

Synonyms: Lotus confusus Serg.



Phytogeographical element: I-T

Habitat: River beds, meadows, fens and mires

Elevational range: 490 - 3400 Flowering period: V - VII

Remarks: Cryptophyte; plant up to 50 cm high; flowers 8–10 mm; corolla yellow, becoming red or purple after pollination; style 3-4 mm; narrow part of 2 upper calyx teeth more than half their length.

976. Medicago lupulina L.



Phytogeographical element: I-T, E-S, M

Habitat: River beds, fields, steppes, xeric shrubs,

thermophilous shrubs, forbs Elevational range: 400 - 3300 Flowering period: IV - VII

Remarks: Therophyte; plant 15-60 cm high, glabrescent to pubescent; stems decumbent, prostrate, much branched; leaflets elliptic, ovate, 5-20 4-6 mm, pubescent, margin distally obscurely serrate; flowers 10-20 in small heads;

calyx ca. 2 mm. Usefulness: For.











977. Medicago minima (L.) L.

Synonyms: Medicago minima (L.) Bartalini, Medicago polymorpha L. var. minima L.



Phytogeographical element: I-T, M, E-S Habitat: Fens and mires, fields, steppes

Elevational range: 300 - 1200 Flowering period: IV - V

Remarks: Therophyte; plant 8–35 cm high; legume 3–5 mm in diameter, spiny, sparsely villous.

Usefulness: For.

978. Medicago orbicularis (L.) Bartal.

Synonyms: Medicago polymorpha L. var. orbicularis L.



Phytogeographical element: I-T, M Habitat: River beds, fields, steppes Elevational range: 800 - 1800 Flowering period: IV - V

Remarks: Therophyte; plant 10–100 cm high; inflorescence a 1–5-flowered peduncled raceme; fruits without spikes,

glabrous. Usefulness: For.

979. Medicago orthoceras (Kar. & Kir.) Trautv.

Synonyms: Trigonella orthoceras Kar. & Kir.



Phytogeographical element: I-T, M Habitat: River beds, salt shrubs, steppes

Elevational range: 350 - 850 Flowering period: IV - VII

Remarks: Therophyte; plant 5–15 cm high; leaflets glabrous at the upperside; stipules 2–3 mm long; peduncles hardly developed; pedicels 1.5–3 mm long, pubescent; inflorescence 1–4 flowered; flowers 4–7.5 mm long; calyx campanulate; ovary and fruit glabrous.

Usefulness: Med, For.

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980. Melilotus albus Medik.

Synonyms: Melilotus officinalis (L.) Pall. var. albus (Medik.)

Ohashi. & Tateishi



Phytogeographical element: Plurireg Habitat: River beds, fields, xeric shrubs

Elevational range: 700 - 2600 Flowering period: VI - IX

Remarks: hemicryptophyte; plant 30–150 cm high; leaves serrate only in upper part; flowers 3.5–7 mm long; siliqua

3–5 mm long.

Usefulness: For, Foo, Ind.

981. Melilotus indicus (L.) All.

Synonyms: Trifolium melilotus L.



Phytogeographical element: Plurireg Habitat: River beds, ruderal, fields Elevational range: 400 - 1000

Flowering period: V

Remarks: Therophyte; plant 12–50 cm high; stipule 4–8 mm long; flowers yellow up to 3 mm; pedicels less

than 1 mm.

982. Meristotropis bucharica (Regel) Kruganova

Synonyms: Glycyrrhiza bucharica Regel, G. kulabensis Masl.



Phytogeographical element: I-T Habitat: River beds, screes Elevational range: 700 - 1700 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 80–100 cm high; leaves 6–15 (–20) cm long; flowers white, 5–7 mm long,

glabrous; fruits 1–2 cm long.

Usefulness: Med.























983. Onobrychis baldshuanica Sirj.



Phytogeographical element: E, I-T Habitat: Steppes, thermophilous shrubs Elevational range: 600 - 1800

Flowering period: V

Remarks: Cryptophyte; plant 40-80 cm high; standard pubescent; calyx 7–10(–12) mm long; siliqua shortly

pubescent; leaflets ovate.

984. Onobrychis chorassanica Boiss.

Synonyms: Onobrychis chorassanica Bunge, Xanthobrychis chorassanica (Bunge) Galushko



Phytogeographical element: I-T Habitat: Steppes, xeric shrubs Elevational range: 850 - 1700 Flowering period: V - VI

Remarks: Cryptophyte; plant 20-80 cm high; standard pubescent; calyx 8-12 mm long; plant densely villous.

Usefulness: For.

985. Onobrychis echidna Lipsky

Synonyms: Onobrychis darwasica Vass.



Phytogeographical element: I-T

Habitat: Steppes

Elevational range: 2400 - 3900

Flowering period: VI - VIII

Remarks: Nanophanerophyte; plant 20-80 cm high; with spinescent leave rachis, siliques with teeth on back side.

986. Onobrychis grandis Lipsky



Phytogeographical element: SE, I-T Habitat: Steppes, xeric shrubs, forbs Elevational range: 1100 - 2450 Flowering period: V - VI

Remarks: Cryptophyte; plant (40–)60–100 cm high; stipule 10–20 mm long; standard pubescent; flowers rose.

Usefulness: For.

987. Onobrychis laxiflora Baker

Synonyms: *Onobrychis laxiflora* subsp. *schugnanica* (B. Fedtsch.) Ali, *O. laxiflora* var. *schugnanica* (B. Fedtsch.) Ali, *O. schugnanica* B. Fedtsch.



Phytogeographical element: I-T

Habitat: Loose sandy screes, screes, steppes

Elevational range: 1100 - 2500 Flowering period: VI - VII

Remarks: Cryptophyte; plant 2–70 cm high; standard

pubescent; calyx 4–7 mm long.

Usefulness: For.

988. Onobrychis pulchella Schrenk



Phytogeographical element: I-T

Habitat: Alpine meadows, fields, steppes, thermophilous shrubs

Elevational range: 400 - 2200 Flowering period: IV - VI

Remarks: Therophyte; plant 15–75 (–80) cm high; stem and siliques glabrous; leaves 5–15 (–17) cm long, paripinnate

with 3-6(-7) pairs of leaflets.

Usefulness: For.



















989. Onobrychis viciifolia Scop.



Phytogeographical element: A, I-T Habitat: Ruderal, steppes Elevational range: 900 - 2200 Flowering period: V - VII

Remarks: Cryptophyte; plant 50–120 cm high; leaflets

4–8 mm wide; calyx 6.5–8 mm long.

Usefulness: For.

990. Oxytropis bella B. Fedtsch.



Phytogeographical element: E, EI-T Habitat: Salt marshes, alpine steppes Elevational range: 1600 - 4000 Flowering period: VI - VII

Remarks: Cryptophyte; plant 3–10 cm high; caespitose, densely gray pubescent; leaves 5–9(–15)-foliolate; calyx

(4.5–)6–8 mm; corolla standard (6–)7–9 mm.

Usefulness: For.

991. Oxytropis capusii Franch.



Phytogeographical element: E, I-T

Habitat: Juniper forests, broad-leaved forests, loose sandy

screes

Elevational range: 2000 - 3000 Flowering period: VI - VII

Remarks: Cryptophyte; plant (15–)20–40 cm high; leaves with 12–25 pairs of leaflets; keel tooth up to 2 mm;

siliques with peduncles 0.5-1 mm long.

992. Oxytropis chionobia Bunge



Phytogeographical element: EI-T

Habitat: Alpine semi-deserts, alpine steppes

Elevational range: 2800 - 4600 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 2–10 cm high; acaulescent, tuft- or cushion-forming, covered by dense silvery trichomes; leaves 1–3 cm; leaflets verticillate with 6–12 whorls, 4–6 blades per whorl; racemes 1- or 2-flowered; calyx cylindric, 10–15 × 2–4 mm, with whitish cottonlike trichomes; corolla bluish purple; standard 1.4–2.2 cm, keel 1.4–1.6 cm, beak 0.5–1 mm; legume sessile, ellipsoid 1.3–2 × 0.6 cm, slightly inflated, leathery.

993. Oxytropis guntensis B. Fedtsch.



Phytogeographical element: E, EI-T

Habitat: Screes

Elevational range: 3250 - 3900 Flowering period: VI - VII

Remarks: Cryptophyte; plant 10–30 cm high; stem 1–2 cm long; standard 7–9 mm long; fruits oblong or ovate-

oblong, with straight beak.

Usefulness: For.

994. Oxytropis hirsutiuscula Freyn

Synonyms: Oxytropis glabra DC. var. pamirica B. Fedtsch. ex O. Fedtsch.



Phytogeographical element: SE, I-T

Habitat: Alpine steppes Elevational range: 3400 - 4100 Flowering period: VII - VIII

Remarks: Cryptophyte; plant (3–)5–10 cm high; hispidous; leaves with 7–12(–13) pairs of leaflets; peduncles shorter that leaves (or almost equal); standard 7–10 mm long;

fruit straight. Usefulness: For.



















995. Oxytropis humifusa Kar. & Kir.

Synonyms: Oxytropis lapponica var. humifusa (Kar. & Kir.) Baker



Phytogeographical element: EI-T

Habitat: Alpine semi-deserts, alpine meadows

Elevational range: 3800 - 4400 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 2–5(8) cm high; stipules lanceolate, free part ca. 5 mm, 1-1.2 cm, membranous to leathery, persistent, adnate to petiole; peduncles thick, straight; calyx campanulate, 5-6 mm, with dense black short and white long trichomes; corolla purple, standard 0.8-1.3 cm. Usefulness: For.

996. Oxytropis michelsonii B. Fedtsch.



Phytogeographical element: E, I-T

Habitat: Alpine steppes, moraines and snow-beds

Elevational range: 2300 - 3300

Flowering period: VII

Remarks: Cryptophyte; plant 5–20 cm high; stems inconspicious; leaves with (10–) 14–24 pairs of leaflets; stipules white or pinkish, glabrous, fused together at almost whole their length and at the base also with the petiole; calyx teeth 1.5–2 × shorter than calyx tube; keel sharply pointed, 1.5–2 (–2.5) mm long; fruit 9–13(–15) mm long.

Usefulness: For.

997. Oxytropis microphylla (Pall.) DC.

Synonyms: Oxytropis chiliophylla Royle



Phytogeographical element: EI-T Habitat: Alpine steppes Elevational range: 3200 - 4700 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 7–25 cm high with irony

glandular leaflets, 3–6 in

a whorl. Usefulness: For.

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998. Oxytropis pamiroalaica Abdusal.



Phytogeographical element: E, I-T

Habitat: Steppes

Elevational range: 2300 - 3700 Flowering period: VI - VII

Remarks: Cryptophyte; plant 5-20 cm high; hirsute; stipules 8-15(-20) mm long, with long ciliae, up to 1/3–1/2 fused with petiole, their free ends initially green, later becoming reddish; standard 8-10 mm long; fruits with hairs not tightly appressed to the fruit surface; fruit pedicel 1-2 mm long.

Usefulness: For.

999. Oxytropis platysema Schrenk



Phytogeographical element: I-T Habitat: Steppes, alpine meadows Elevational range: 2300 - 5200 Flowering period: VI - VII

Remarks: Cryptophyte; plant 2-8 cm high; acaulescent, forming loose tufts; stipules membranous, glabrous or only ciliate, free or slightly adnate to petiole; leaves 2-6 cm, (11-)13-19(-21) foliolate; leaflet blades ovatelanceolate, $3-10(-12) \times 1.5-4$ mm; racemes compact, 3-7-flowered; peduncle 2-6.5 cm; calyx 6-9 mm with black and white hairs, teeth as long as tube; flower 9-12 mm, violet.

1000. Oxytropis puberula Boriss.



Phytogeographical element: EI-T Habitat: Meadows, fens and mires Elevational range: 1400 - 2100 Flowering period: VI - VII

Remarks: Cryptophyte; plant 30-120 cm high; shortly pubescent; leaves with 3-7 pairs of leaflets; stipules (3–)5–12 mm long, hairy, fused together up to 1/2 of their length; peduncles longer than leaves; standard 5-7(-8) mm long.

























1001. Oxytropis rosea Bunge



Phytogeographical element: I-T Habitat: Steppes, thermophilous shrubs

Elevational range: 850 - 1850 Flowering period: V - VII

Remarks: Cryptophyte; plant 15-30 cm high; spreading pilose; stipules 7-10 mm, membranous, fused with stipule; leaves ca. 7–17 cm long, imparipinnately compound, leaflets 10–18 pairs, ca. $5-10 \times 2-4$ mm, entire, silky pilose on both sides; calyx 5-8 mm, teeth ca. 4-6 mm; flower 10-13, standard 10-12 mm; wing 11–11.5 mm; keel ca. 9–10 mm; legume $10–20 \times 4–5$ mm.

1002. Oxytropis savellanica Boiss.

Synonyms: Oxytropis savellanica Bunge



Phytogeographical element: I-T Habitat: Moraines and snow-beds Elevational range: 2650 - 4400 Flowering period: VII - VIII

Remarks: Chamaephyte; plant 3-7 cm high, cushionlike dwarf shrub; stems 3–25 cm long; leaves 2–4 cm long; leaflets 1.5-3 mm long; stipules very thin, nearly transparent, fused up to 1/2-2/3; flowers small, 8-10 mm long.

Usefulness: For.

1003. Oxytropis tachtensis Franch.



Phytogeographical element: SE, I-T Habitat: Juniper forests, steppes Elevational range: 1700 - 2900 Flowering period: V - VI

Remarks: Cryptophyte; plant 20-40 cm high; keel tooth 3–5 mm long; siliques with pedicels 1.5–2 mm and tooth

1.5-3 mm.

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1004. Oxytropis trichosphaera Freyn



Phytogeographical element: E, EI-T Habitat: Screes, moraines and snow-beds

Elevational range: 2500 - 4600 Flowering period: VII

Remarks: Cryptophyte; plant 5–10(–12) cm high; densely pubescent; stem inconspicious or up to 1 cm long; leaves with 2–5 pairs of leaflets; standard 9–11 mm long; keel sharply pointed (1.5–)2–2.5 mm long; calyx 7–10 mm long, calyx teeth equal to calyx tube or longer; fruit 8–10 mm long, completely hidden in the calyx.

Usefulness: For.

1005. Pisum sativum L.

Synonyms: Pisum arvense L.



Phytogeographical element: I-T, M

Habitat: Fields

Elevational range: 800 - 2800 Flowering period: VI - VII

Remarks: Therophyte; plant annual, up to 100 cm high;

leaflets often serrate; calyx 8–10 mm long.

Usefulness: For, Foo.

1006. Prosopis farcta (Banks & Sol.) J.F. Macbr.

Synonyms: Lagonychium farctum (Banks & Soland.) Bobr., Mimosa farcta Banks & Sol.



Phytogeographical element: I-T, M

Habitat: Fields, steppes, thermophilous shrubs

Elevational range: 500 - 900 Flowering period: VI - VII

Remarks: Chamaephyte, Nanophanerophyte; plant 30–100 cm high; thorny shrub; stamens 10, siliques

1.5–5 cm long. Usefulness: Foo, Ind.





















1007. Sophora alopecuroides L.

Synonyms: Goebelia alopecuroides (L.) Bunge ex Boiss., Pseudosophora alopecuroides (L.) Sweet, Vexibia alopecuroides (L.) Yakovl.



Phytogeographical element: I-T, M, E-S Habitat: River beds, ruderal, fields, salt shrubs

Elevational range: 500 - 1700 Flowering period: V to VI

Remarks: Cryptophyte; plant 40–90 cm high; keel apex

acute; flowers pale yellow; siliques thin.

Usefulness: Hou.

1008. Sophora pachycarpa C.A. Mey.

Synonyms: *Goebelia pachycarpa* (Schrenk ex C.A.Mey.) Bunge, *G. pachycarpa* (Schrenk ex C.A. Mey.) Bunge ex Boiss., *Vexibia pachycarpa* (C.A.Mey.) Yakovl.



Phytogeographical element: I-T

Habitat: River beds, salt shrubs, steppes

Elevational range: 350 - 1600 Flowering period: V to VI

Remarks: Cryptophyte; plant 27–40(–50) cm high; keel apex obtuse; flowers light yellow; siliques thick,

cylindrical.

1009. Sphaerophysa salsula (Pall.) DC.

Synonyms: Phaca salsula Pall.



Phytogeographical element: I-T, E-S, M Habitat: River beds, riverside forests Elevational range: 400 - 1400

Flowering period: IV to VII

Remarks: Cryptophyte; plant perennial, 60-120 cm high;

siliqua swollen; style pubescent under stigma.

1010. Thermopsis dolichocarpa V. Nikit.



Phytogeographical element: I-T (E) Habitat: river beds, salt shrubs, steppes

Elevational range: 960 – 2800 Flowering period: V-VIII

Remarks: Chamaephyte; plant 50-80cm high; leaves with 2-4 cm long petioles; calyx 13–15 mm; corolla yellow; legume

linear, $7-11 \times 0.8-1$ cm, densely pubescent.

1011. Thermopsis turkestanica Gand.

Synonyms: *Thermopsis lanceolata* R. Br. subsp. *turkestanica* (Gand.) Gubanov



Phytogeographical element: I-T, E-S

Habitat: Meadows

Elevational range: 1200 - 2000 Flowering period: V fo VII

Remarks: Cryptophyte; plant 30–60 cm high; leave stipules lanceolate 1.8–3.2, leaflets narrowly lanceolate 3.5–8 \times 0.5–1 cm, densely puberulent abaxially, glabrous adaxially; racemes 4.5–20 cm; flowers in 5 or 6 whorls; calyx 15–20 mm; corolla yellow 2.3–2.5 cm; legume linear, 4.5–7 \times 0.8–1.3 cm, densely pubescent

1012. Trifolium fragiferum L.

Synonyms: Amoria fragifera (L.) Roskov, Galearia fragifera (L.) C. Presl



Phytogeographical element: Plurireg Habitat: Fens and mires, salt marshes Elevational range: 2300 - 2300

Flowering period: V to IX

Remarks: Cryptophyte; plant 20–50 cm high; erect to decumbent; abundantly leaved, green; internodes and leaves slightly pubescent; leaflets 1.5–3.0 cm long, obovate to broadly elliptic, obscurely dentate; stipules ovate-lanceolate, free portion abruptly mucronate; inflorescence a dense head, sessile or rarely pedunculate; flowers without bracts; calyx pubescent, with 10 nerves, calyx cup ca. 3 mm long; corolla reddish-purple to pink, rarely whitish; standard emarginate; fruit 1-seeded.

Usefulness: For.























1013. Trifolium lappaceum L.



Phytogeographical element: Plurireg

Habitat: Roadsides, fallows, arable fields, steppes, shrubs

Elevational range: 700 - 1200 Flowering period: V to VII

Remarks: Cryptophyte; plant 10–30 cm high; leaflets obovate to oblanceolate and villous on both surfaces; flowers in nearly sessile, globose to ovoid heads; calyx with 5 lobed, and with long, bristle-like hairs, tube with 20 nerves; corolla white to pinkish, shorter to slightly longer than calyx.

1014. Trifolium pratense L.

Synonyms: Trifolium ukrainicum Opperm. ex Wissjul.



Phytogeographical element: Plurireg

Habitat: Broad-leaved forests, riverside forests, forbs

Elevational range: 400 - 2500 Flowering period: V to IX

Remarks: Cryptophyte; plant 20–70 cm high; leaves palmately 3-foliolate, leaflets 1.5–3.0 cm long; inflorescence sessile or rarely pedunculate; calyx teeth almost twice the length of the cup; calyx cup ca. 3 mm long; corolla reddish-purple to pink, rarely whitish.

Usefulness: Med, For, Foo.

1015. Trifolium repens L.

Synonyms: Amoria repens (L.) C. Presl



Phytogeographical element: E-S, I-T, M, Arctic

Habitat: Broad-leaved forests, riverside forests, fens and

mires

Elevational range: 400 - 3000 Flowering period: IV to IX

Remarks: Cryptophyte; plant 5–35 cm high; leaflets pubescent on both sides; stipules 5–6 mm long; inflorescence 1–2 flowered (rarely 3–4); corolla white; wings 5–6 mm long; standard 6–7.5 mm long, ovate, emarginate; fruit 2.5–4.7 cm long, with wide, nearly square–shape ,cells', and short (up to 1 mm) beak at the apex.

Usefulness: For.

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1016. Trigonella badachschanica Afan.

Synonyms: Melilotoides badachschanica (Afan.) Soják, Melissitus badachschanicus (Afan.) Ikonn.



Phytogeographical element: I-T

Habitat: Screes

Elevational range: 2100 - 2100

Flowering period: VII

Remarks: Cryptophyte; plant (20-)30-40 cm high; standard $10-12 \times 3.5-4$ mm, oblong-elliptic; wings 7-8 mm long;

flowers pale yellow.

1017. Trigonella geminiflora Bunge

Synonyms: *Trigonella monantha* C.A. Mey. subsp. *geminiflora* (Bunge) Rech. fil.



Phytogeographical element: I-T, E-S

Habitat: Juniper forests, broad-leaved forests, semi-deserts,

fields, steppes, thermophilous shrubs

Elevational range: 400 - 2600 Flowering period: III to VII

Remarks: Therophyte; plant 15–25 cm high; leaflets glabrous at upperside; stipules 2–4 mm long; peduncles very short, rarely 1 cm in length; inflorescence 1–4 flowered; calyx campanulate; corolla yellow; flowers 4–7.5 mm long; ovary

and fruit covered with appressed trichomes.

Usefulness: For.

1018. Trigonella pamirica Boriss.

Synonyms: *Melilotoides pamirica* (Boriss.) Soják, *Melissitus pamiricus* (Boriss.) Golosk.

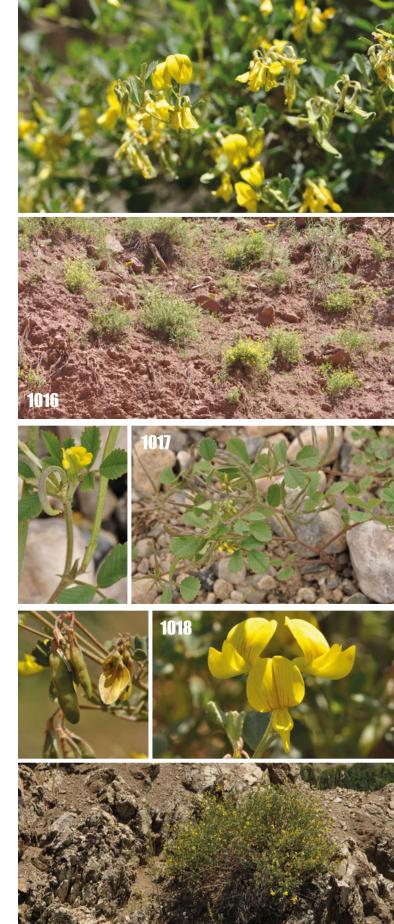


Phytogeographical element: E, I-T Habitat: River beds, rocks, screes Elevational range: 2000 - 4300 Flowering period: VI to VIII

Remarks: Cryptophyte; plant (18–) 25–30(–45) cm high; standard $8-11 \times 5-6$ (–7) mm; flowers bright yellow; legume (1–)1.1–1.5 cm long and 3.5–4 mm wide, oblong or

lanceolate-oblong, brownish-yellow.

Usefulness: For.









1019. Trigonella verae Sirj.



Phytogeographical element: E, I-T

Habitat: Juniper forests, steppes, xeric shrubs

Elevational range: 1300 - 2200 Flowering period: IV to VI

Remarks: Therophyte; plant 5–15 cm high; leaflets glabrous adaxially; inflorescence 1–4-flowered, peduncle undeveloped; calyx 3–5 mm long, bell-shaped; standard

5–7.5 mm long; legumes glabrous.

1020. Vicia angustifolia L.

Synonyms: Vicia sativa L. subsp. nigra (L.) Ehrh.



Phytogeographical element: Plurireg

Habitat: River beds, riverside forests, meadows

Elevational range: 700 - 2600 Flowering period: III to V

Remarks: Therophyte, hemicryptophyte; plant 10–75 cm high; inflorescence 2-flowered; calyx 1.1–2 cm long;

flower purple; siliques blackish.

Usefulness: For, Foo.

1021. Vicia kokanica Regel & Schmalh.



Phytogeographical element: I-T Habitat: Screes, xeric shrubs Elevational range: 1700 - 2900 Flowering period: V to VIII

Remarks: Cryptophyte; plant 20–70 cm high; leaves 5-10 cm with 2-6 pairs of leaflets; inflorescence 3–5(7)–flowered on 1.5-3 cm long peduncles; calyx 3.5–6 mm

with unequal teeth; standard 1-1.4 cm.

Usefulness: For.

1022. Vicia michauxii Spreng.

Synonyms: Vicia peregrina L. subsp. michauxii (Spreng.)
Ponert



Phytogeographical element: I-T, M Habitat: River beds, fields, steppes Elevational range: 800 - 1850

Flowering period: IV

Remarks: Therophyte; plant annual, 20–65 cm high; stipule pubescent; standard 1–1.7 cm; silique pubescent 2.3–4 cm.

2.5–4 CIII.

1023. Vicia peregrina L.

Synonyms: Vicia megalosperma M. Bieb., Vicia peregrina subsp. megalosperma (M. Bieb.) Ponert



Phytogeographical element: I-T

Habitat: Fields

Elevational range: 900 - 1700 Flowering period: IV to VI

Remarks: Therophyte; plant 20–100 cm high; inflorescence 1–2-flowered; calyx 6–7 mm with unequal teeth; standard

glabrous. Usefulness: For.

1024. Vicia tenuifolia Roth

Synonyms: Vicia cracca L. subsp. tenuifolia (Roth) Gaudin



Phytogeographical element: I-T

Habitat: Broad-leaved forests, fields, steppes, xeric shrubs

Elevational range: 1100 - 3300 Flowering period: V to VIII

Remarks: Cryptophyte; plant 40–160 cm high; leaves with 6–12 leaflet pairs, paripinnate, terminated with tendril;

leaflets 1–5 cm long. Usefulness: For, Foo.









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1025. Vicia villosa Roth



Phytogeographical element: Plurireg

Habitat: Fields

Elevational range: 1000 - 1000 Flowering period: V to VI

Remarks: Therophyte, hemicryptophyte; plant 70–100 cm high; leaves 4–9 cm long, with 6–8(–10) leaflet pairs;

inflorescence 5–30-flowered.

1026. Frankenia bucharica Basil.



Phytogeographical element: I-T Habitat: Salt shrubs, salt marshes Elevational range: 400 - 800 Flowering period: V to VII

Remarks: Chamaephyte; plant 20-40(-55) cm high; stem covered with straight hairs 1-2 mm long; oblong-ovate leaves with slightly curled edges, flowers 8–9 mm long.

1027. Frankenia pulverulenta L.



Phytogeographical element: Plurireg

Habitat: salty places

Elevational range: 400 – 500 Flowering period: IV-VI

Remarks: Therophyte; plant procumbent; leaves spathulate to obovate, 3-7 mm long, 1-3 mm broad; flowers sessile, axillary solitary or in dichasial cymes; petals 5, pink, c. 4

mm long, obovate.

1028. Fumariola turkestanica Korsh.



Phytogeographical element: I-T

Habitat: Rocks

Elevational range: 1500 - 2000 Flowering period: VI to VIII

Remarks: Cryptophyte; Tiny plant up to 13 cm high, green, glabrous; leaves biternate, composed of oblong segments, apex obtuse, margin entire; racemes 2–4 cm, 2–10-flowered; calyx ca. 2 mm, glabrous, petals pale yellow, ca. 5 mm long; capsule obovoid 3 mm long.

1029. Centaurium erythraea Rafn

Synonyms: Centaurium umbellatum Gilib., C. umbellatum subsp. austriacum Ronniger, C. minus Moench



Phytogeographical element: I-T, M, E-S

Habitat: Xeric shrubs, forbs Elevational range: 1200 - 1350 Flowering period: V to IX

Remarks: Therophyte; plant 10-40 (-50) cm high; calyx

5–7 mm long; flowers 1.4–1.6 cm long.

1030. Centaurium pulchellum (Sw.) Druce

Synonyms: Gentiana pulchella Sw., Centaurium candelabrum Lindb. fil



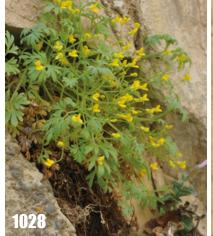
Phytogeographical element: Plurireg

Habitat: River beds, riverside forests, fens and mires, fields

Elevational range: 400 - 3500 Flowering period: V to VII

Remarks: Therophyte; plant 3-25 (-40) cm high; calyx

6–9 mm long; flowers 1–1.3 cm long.





























1031. Centaurium spicatum (L.) Fritsch

Synonyms: Gentiana spicata L., Erythraea spicata Pers.



Phytogeographical element: I-T, M Habitat: River beds, fields, salt marshes

Elevational range: 350 - 1000 Flowering period: VI to X

Remarks: Therophyte; plant (4–)10–15 cm high; basal leaves widely ovate, early withering; inflorescence a

spicate cyme.

1032. Comastoma falcatum (Turcz.) Toyok.

Synonyms: Gentiana falcata Turcz., Gentianella falcata (Turcz.) H. Smith



Phytogeographical element: I-T, E-S Habitat: Fens and mires, alpine swards Elevational range: 3600 - 4200 Flowering period: VII to VIII

Remarks: Therophyte; plant 4–25 cm high; stem leaf blades 3–4(–6) mm wide; calyx 4- or 5-lobed, not enveloping corolla tube, ca. 1/2 as long as corolla, lobes falcate, apex acuminate; corolla blue, dark blue or blue-purple, with blackish veins, salverform.

1033. Comastoma tenellum (Rottb.) Toyok.

Synonyms: Comastoma dichotomum (Pall.) Holub, Gentiana tenella Rottb., Gentianella dichotoma (Pall.) H. Smith., Lomatogonium tenellum (Rottb.) Á. Löve & D. Löve



Phytogeographical element: EI-T Habitat: Alpine meadows, alpine swards

Elevational range: 2500 - 4200 Flowering period: VI to IX

Remarks: Therophyte; plant 5–10 cm high; branched from base; basal leaves spatulate $5-8 \times 2-3$ mm; flowers terminal, solitary; pedicel to 8 cm; calyx lobes slightly unequal, lanceolate, 7 3 mm, apex acute; corolla $7-11 \times 3$ mm; scales 2, fimbriae ca. 1.5 mm, apex obtuse; ovary ovoid-ellipsoid, ca. 7 mm.

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Gentianaceae

1034. Gentiana algida Pall.

Synonyms: Gentianodes algida (Pall.) Á. Löve & D. Löve, Pneumonanthe algida (Pall.) F.W. Schmidt



Phytogeographical element: Plurireg Habitat: Alpine meadows, alpine swards

Elevational range: 1500 - 4200 Flowering period: VI to VIII

Remarks: Cryptophyte; plant up to 20 cm high; basal leaves in 1–3 erect rosettes, linear-elliptic to lanceolate 2–5.5 cm 3–5 mm; flowers solitary, rarely in terminal 2 or 3-flowered cymes; calyx obconic 2-2.2 cm, tube entire or slightly split on 1 side; lobes 5–6 mm with obtuse apex; corolla 4-5 cm; lobes ovate to triangular 5-6 mm; capsules ovoid-ellipsoid, 2-3 cm.

1035. Gentiana kauffmanniana Regel & Schmalh.

Synonyms: Tretorhiza kaufmanniana (Regel & Schmalh.) Soják



Phytogeographical element: I-T, E-S Habitat: Alpine swards

Elevational range: 2500 - 3700 Flowering period: V to VIII

Remarks: Cryptophyte; plant (8–)10–25(–40) cm high; calyx (1.8-)2-3 cm long with blunt incisions between

calyx teeth; corolla 4–5(–5.5) cm long.

1036. Gentiana leucomelaena Maxim.



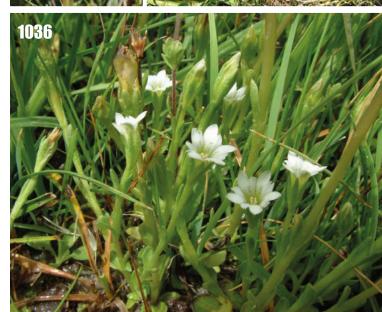
Phytogeographical element: I-T, E-S Habitat: Fens and mires, littoral vegetation

Elevational range: 1700 - 4300 Flowering period: VI to VIII

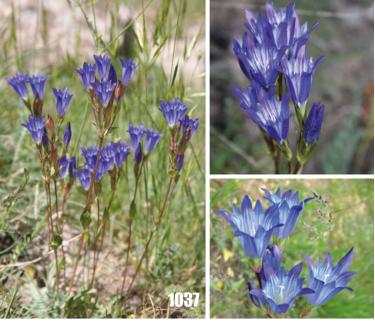
Remarks: Therophyte; plant 2-10 cm high, stem ascending, branched from base; calyx campanulate, 4-5 mm; corolla pale blue or white, 0.8-1.3 cm, lobes ovate, 2.5-3 mm;

capsules obovoid, 3.5-5 mm.





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1037. Gentiana olivieri Griseb.

Synonyms: Tretorhiza olivieri (Griseb.) Soják



Phytogeographical element: I-T, M

Habitat: Steppes

Elevational range: 300 - 3700 Flowering period: IV to VIII

Remarks: Cryptophyte; plant (10–)12–30(–40) cm high; calyx 1.1–1.3(–1.5) cm long, sharp incisions between

calyx teeth; corolla 2.5-3 cm long.

1038. Gentiana prostrata Haenke

Synonyms: *Ciminalis prostrata* (Haenke) Á. Löve & D. Löve, *Varasia prostrata* (Haenke) Soják



Phytogeographical element: I-T

Habitat: Fens and mires, alpine swards, moraines and

snow-beds

Elevational range: 3900 - 4800 Flowering period: VII to IX

Remarks: Therophyte; plant 3–7 cm high; stems usually papillate; leaves usually lax, not in well-defined ranks, stem leaf blades spatulate to obovate; corolla tubular; stamens inserted at middle of corolla tube; filaments

2–5 mm; seeds without spongy edges.

1039. Gentiana prostrata var. karelinii (Griseb.) Kusn.

Synonyms: *Gentiana karelinii* Griseb., *G. prostrata* Haenke var. *karelinii* (Griseb.) Kusn.



Phytogeographical element: I-T, E-S Habitat: Fens and mires, alpine swards Elevational range: 2800 - 4300

Flowering period: VI to VIII

Remarks: Therophyte; plant up to 7 cm high; stems glabrous; leaf margin smooth or less papillate; calyx

usually 3/4 as long as corolla.

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Gentianaceae

1040. Gentiana squarrosa Ledeb.

Synonyms: *Ciminalis squarrosa* (Ledeb.) Zuev, *Varasia squarrosa* (Ledeb.) Soják



Phytogeographical element: I-T, E-S

Habitat: Fens and mires Elevational range: 2600 - 3500 Flowering period: VI to VII

Remarks: Therophyte; plant 2–8 cm high; basal leaves well developed, 6–10 mm, petiole 1–2 mm, densely papillate; calyx 5–8 mm, tube outside sometimes densely papillate, lobes recurved; corolla blue to dark blue, throat unmarked, lobes obtuse, scarcely exceeding calyx; seeds dark brown.

1041. Gentiana tianschanica Rupr. ex Kusn.

Synonyms: Gentiana kirilowii Turcz., Tretorhiza tianschanica (Rupr.) Soják



Phytogeographical element: I-T, Himal Habitat: Alpine meadows, alpine swards

Elevational range: 1500 - 3900 Flowering period: VI to IX

Remarks: Cryptophyte; plant 15–25 cm high; stem simple and glabrous; basal leaves linear-elliptic $8-16\times0.8-1.8$ cm; cymes axillary or terminal; flowers sessile; calyx tube 7–9 mm, lobes linear 7–10 mm, unequal; corolla funnelform, 2–3 cm, lobes ovate-elliptic 4–6 mm, apex obtuse; capsules narrowly ellipsoid, 1.2–1.5 cm.



















1042. Gentianella pygmaea (Regel & Schmalh.) Harry Sm. ex S. Nilsson

Synonyms: *Gentiana pygmaea* Regel & Schmalh., *Gentianella pygmaea* (Regel & Schmalh.) Ikonn.



Phytogeographical element: I-T Habitat: Fens and mires Elevational range: 3800 - 4800 Flowering period: VII to VIII

Remarks: Therophyte, hemicryptophyte; plant (1.5–)3–5(–6) cm high; leaves petiolate, blade base narrowed, apex obtuse to rounded; flowers 4 or 5-merous; calyx lobes elliptic to rhomboid, erect; corolla pale yellow to violet.

1043. Gentianella saposhnikovii (Pachom.) Czerep.

Synonyms: Gentiana saposhnikovii Pachom.



Phytogeographical element: EI-T, Himal Habitat: Alpine meadows, alpine swards Elevational range: 3300 - 5300

Flowering period: VI to VIII

Remarks: Therophyte; plant 1–5 cm high; stems much branched from base; leaves spatulate to obovate, $3-9 \times 1-1.2$ mm including petiole, apex obtuse; flowers 4-merous; calyx 3–4 mm; corolla 4.5–5.5 \times 3–4 mm, lobes oblong, 2–2.5 mm; capsules ovoid-ellipsoid, 5.5–6 mm; seed coat reticulate.

1044. Gentianella sibirica (Kusn.) Holub

Synonyms: Gentiana pamirica Grossh., G. umbellata M. Bieb. var. sibirica (Kusn.) Serg., G. sibirica (Kusn.) Grossh., Gentianella pamirica (Grossh.) Holub.



Phytogeographical element: I-T, E-S Habitat: Fens and mires, alpine swards Elevational range: 2500 - 4000

Elevational range: 2500 - 4000 Flowering period: V to VII

Remarks: Therophyte, hemicryptophyte; plant (5–)10–25(–30) cm high; flowers 4–5-merous, pale blue, yellowish or whitish; calyx (4–)5–7 mm, split up to 1/3–1/2, teeth lanceolate; corolla 5–9(–10) mm, slightly longer than calyx, splited to 1/3.

1045. Gentianella turkestanorum (Gand.) Holub

Synonyms: Gentiana turkestanorum Gand.



Phytogeographical element: I-T, E-S

Habitat: Fens and mires Elevational range: 2500 - 3500 Flowering period: VII to VIII

Remarks: Therophyte, hemicryptophyte; plant (7–)10–45 (–60) cm high; petals with appendages 1 mm; calyx lobes apiculate, uneven; flowers (0.9–)1–1.7 (–2) cm long, arranged in gable heads surrounded by leaves, light blue or yellowish.

1046. Gentianopsis stricta (Klotzsch) Ikonn.

Synonyms: Gentiana stricta Klotzsch, Gentianopsis stricta (Klotzsch) Holub



Phytogeographical element: Plurireg

Habitat: Alpine swards Elevational range: 3100 - 4500 Flowering period: VII to VIII

Remarks: Therophyte, hemicryptophyte; plant (15–)20–40 cm high; calyx teeth equal or almost equal, shorter

than corolla tube by 4-9 mm.

1047. Lomatogonium carinthiacum (Wulfen) A. Braun

Synonyms: *Lomatogonium carinthiacum* (Wulfen) Rchb., *Pleurogyne carinthiaca* (Wulfen) Griseb.



Phytogeographical element: Plurireg

Habitat: Riverside forests, alpine meadows, fens and mires

Elevational range: 2500 - 4500 Flowering period: VII to VIII

Remarks: Therophyte, hemicryptophyte; plant annual or biennial, 5–20 cm high; calyx tube 1–1.5 mm long, with lobes elliptic to lanceolate, apex obtuse to acute; corolla blue to white–blue, usually 0.8–2 cm in diameter.























1048. Pleurogynella brachyanthera (C.B. Clarke) Ikonn.

Synonyms: Pleurogyne brachyanthera C.B. Clarke



Phytogeographical element: I-T, E-S Habitat: Fens and mires, alpine swards Elevational range: 3100 - 4400

Flowering period: VIII

Remarks: Therophyte; plant 3–15 cm high; leaves in the rosette and cauline; corolla funnel-shaped, corolla tube 2.5–3 mm long, petals connate; anthers up to 1 mm long.

1049. Swertia graciliflora Gontsch.



Phytogeographical element: SE, I-T

Habitat: Fens and mires, moraines and snow-beds

Elevational range: 2300 - 3800 Flowering period: VI to VII

Remarks: Cryptophyte; plant 10–20 cm high; calyx lobes with narrow indistinct membranous margin; nectaries 2 per corolla lobe, cupular, with pilose fimbriae 2–2.5 mm.

1050. Swertia juzepczukii Pissjauk.



Phytogeographical element: I-T

Habitat: Fens and mires, moraines and snow-beds

Elevational range: 3700 - 3800 Flowering period: VI to VII

Remarks: Cryptophyte; plant 25–80 cm high; basal leaves 4; nectaries close together but not united; anthers with

short appendages.

1051. Swertia lactea Bunge



Phytogeographical element: I-T Habitat: Fens and mires Elevational range: 1800 - 3600 Flowering period: VII to VIII

Remarks: Cryptophyte; plant up to 70 cm high; flowers 4-merous, white or bluish; nectaries rounded or reniform,

with appendages along the edges.

1052. Swertia marginata Schrenk



Phytogeographical element: I-T Habitat: Fens and mires Elevational range: 2600 - 4600 Flowering period: VII to VIII

Remarks: Cryptophyte; plant 15–35 cm high; calyx lobes with broad distinct membranous margin; nectaries 2 per corolla lobe, cupular, with pilose fimbriae 3–4 mm.

1053. Erodium cicutarium (L.) L'Hér.

Synonyms: Geranium cicutarium L.



Phytogeographical element: Plurireg

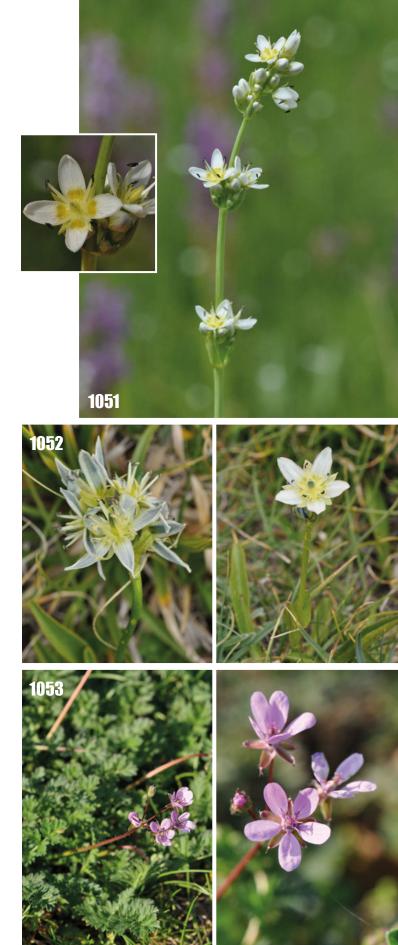
Habitat: River beds, semi-deserts, ruderal, salt shrubs, salt

marshes

Elevational range: 350 - 3100 Flowering period: III to IV

Remarks: Therophyte; plant up to 15 cm high; stems reduced, inconspicuous, 3–5 cm tall; plants green; mericarp awn not plumose; peduncle with (2–)3–10

flowers, glandular.







1054. Erodium oxyrhinchum M. Bieb.



Phytogeographical element: I-T

Habitat: River beds, semi-deserts, ruderal, salt shrubs, salt

marshes

Elevational range: 500 - 2400 Flowering period: III to VI

Remarks: Therophyte; plant 15–30 cm high; stems and petioles densely, shortly pubescent (tomentellous); leaves with 3–5 segments (terminal segment usually larger); peduncle with (1–)2–3 flowers; capsule valves transversally ribbed; mericarp awn plumose, pending out.

1055. Geranium collinum Stephan ex Willd.

Synonyms: Geranium collinum var. wakhanicum Pauls., G. minutum Ikonn., G. wakhanicum (Paulsen) Ikonn.



Phytogeographical element: I-T, M

Habitat: Juniper forests, broad-leaved forests, riverside

forests, meadows, forbs Elevational range: 800 - 3800 Flowering period: V to VIII

Remarks: Cryptophyte; plant 15–120 cm high, without tubers; stem one or several; leaves (2–)3–6(–12) cm in diameter, palmately dissected; leaf segments ovate or wide rhomboid, sinuate-dentate; peduncles with two flowers; pedicels 2–6(–9) cm long; flowers violet, purple-violet, pink or rarely white; petals obovate; seeds 2.5–3 mm long,

with fine-meshed surface. Usefulness: Med, For.

1056. Geranium dissectum L.



Phytogeographical element: Geraniaceae, Plurireg

Habitat: Meadows, fens and mires Elevational range: 800 - 1500 Flowering period: IV to V

Remarks: Therophyte, hemicryptophyte; plant 10–50 cm high; leaves round-shaped, deeply dissected, sepals long

aristate.

1057. Geranium divaricatum Ehrh.



Phytogeographical element: I-T, E-S, M

Habitat: Broad-leaved forests, rocks, loose sandy screes,

fields

Elevational range: 600 - 2500 Flowering period: IV to V

Remarks: Therophyte, hemicryptophyte; plant 20–50 cm high; leaves 5-angular; sepal mucros 0.7–1 mm; mericarps with appressed nonglandular trichomes up to 0.5 mm

long, with transverse ribs.

1058. Geranium linearilobum DC.

Synonyms: Geranium linearilobum subsp. transversale (Kar. & Kir.) P.H. Davis, G. transversale (Kar. & Kir.) Vved. ex Pavlov, G. tuberosum L. var. transversale Kar. & Kir.



Phytogeographical element: I-T Habitat: Rocks, screes Elevational range: 600 - 2800 Flowering period: IV to VI

Remarks: Cryptophyte; plant 10–30 cm high; with several small, rounded tubers, distinctly joined; stem singular; basal leaves present; leaves 3–5(–6) cm in diameter; peduncles 2–3(–4) cm long, with (1–)2–3 flowers; corolla violet or pinkish-violet.

1059. Geranium pusillum L.



Phytogeographical element: Plurireg Habitat: Ruderal, fields, steppes Elevational range: 400 - 2800 Flowering period: IV to X

Remarks: Therophyte; plant 10–50 cm high, often decumbent, pilose and eglandular; leaves opposite, 1.5–3.8 cm, segments 5, obtriangular; cymules solitary, 2-flowered; bracteoles linear-lanceolate; sepals 3–4.5 mm, petals pale purple, 2–3 mm, erect to patent, glabrous with emarginate apex; fruit 0.9–1.1 cm, erect when immature; mericarps smooth, rostrum 7–9 mm.

1057

















1060. Geranium regelii Nevski



Phytogeographical element: I-T

Habitat: Forbs

Elevational range: 2500 - 4000 Flowering period: VI to VIII

Remarks: Cryptophyte; plant (5–) 10–30 cm high, without tubers; stem not developed or short, climbing (rarely erect); plant covered with semi-appressed trichomes, directed downwards; leaves 1–3(–4) cm in diameter, palmately lobed; peduncles 5–17 cm long, with 2 flowers; pedicels 1.5(–2) cm long; flowers brightly bluish–violet, rarely white; petals widely obovate.

Usefulness: For.

1061. Ribes heterotrichum C.A. Mey.

Synonyms: Ribes orientale Desf. var. heterotrichum (C.A. Mey.) Jancz.



Phytogeographical element: I-T

Habitat: Rocks, screes

Elevational range: 1800 - 3500 Flowering period: VI to VII

Remarks: Nanophanerophyte; plant 0.2–1 m high; almost entire plant, except older shoots, densely pubescent, admixed with straight glandular hairs; stipules long-lanceolate, persistent with ripe fruits; flowers dioecious.

1062. Ribes meyeri Maxim.



Phytogeographical element: I-T

Habitat: Juniper forests, riverside forests

Elevational range: 2000 - 4300 Flowering period: VI to VII

Remarks: Nanophanerophyte; plant 2–2.5 m high; leaves

clearly lobed, fruits black.

Usefulness: Foo.

1063. Ribes trilobum Meyen

Synonyms: *Ribes villosum* Wall. ex Roxb., R. *orientale* Desf. var. *schugnanicum* B. Fedtsch.



Phytogeographical element: I-T

Habitat: River beds, screes, xeric shrubs

Elevational range: 1900 - 4300 Flowering period: V to VI

Remarks: Nanophanerophyte; plant up to 1(–1.5) m high; leaves, shoots and rachis densely pubescent, with an admixture of sedentary glandular hairs; stipules lanceolate or linear-lanceolate, falling soon after flowering; flowers dioecious.

1064. Myriophyllum spicatum L.



Phytogeographical element: Plurireg Habitat: Aquatic vegetation, springs Elevational range: 400 - 4100 Flowering period: V to X

Remarks: Cryptophyte; plant with branched stem, 100-250 cm high, densely leafy in upper part; submerged leaves 4- or 5-whorled, pectinate, broadly ovate in outline, $3-3.5 \times 1-2.5$ cm; fruit 4-loculed, subcylindric, ca. 2 1.5 mm.

1065. Najas graminea Delile

Synonyms: Caulinia graminea (Delile) Tzvelev



Phytogeographical element: Plurireg Habitat: Fields, aquatic vegetation Elevational range: 400 - 850 Flowering period: VI to VII

Remarks: Therophyte; plant with stem up to 35–40 cm long; leaves linear, 10–40 \times 0.5–1 mm, acute; sheaths prolonged with narrowly triangular auricles; male flowers without spathe; seeds greenish brown; areole

quadrangular, rectangular-hexagonal.















1066. Najas marina L.

Synonyms: Najas major All.



Phytogeographical element: Plurireg Habitat: Fields, aquatic vegetation Elevational range: 400 - 750 Flowering period: V to VII

Remarks: Therophyte; plant with stem up to 50–55 cm long, more than 1 mm thick; leaves oblong-linear,

 $1-3.5 \text{ mm} \times 2-6 \text{ mm}$, prominently spinose-dentate on the

margins.

1067. Hypericum perforatum L.

Synonyms: *Hypericum komarovii* Gorschk., *H. nachitschevanicum* Grossh.



Phytogeographical element: Plurireg Habitat: Steppes, xeric shrubs, forbs Elevational range: 700 - 3000 Flowering period: VI to VII

Remarks: Cryptophyte; plant 20–60 cm high; stem rough from hard small glandular warts; petals 5–8(–10) mm

long; stamens longer than petals.

Usefulness: Med, Foo.

1068. Hypericum scabrum L.



Phytogeographical element: I-T, E-S

Habitat: Broad-leaved forests, screes, thermophilous

shrubs, forbs

Elevational range: 750 - 3400 Flowering period: V to VII

Remarks: Cryptophyte; plant up to 100 cm high; stem 2-lined, with few black glands on line; inflorescence

5-15 cm long; stamens ca. 1 mm long.

Usefulness: Med.

1069. Crocus korolkowii Maw & Regel

Synonyms: Crocus korolkovii Regel ex Maw



Phytogeographical element: SE, I-T

Habitat: Alpine meadows, thermophilous shrubs, forbs

Elevational range: 950 - 1900 Flowering period: II to V

Remarks: Cryptophyte; plant 10–15 cm high; tepals yellow; external tepals and perianth tube with purple streaks.

Usefulness: Foo, Orn.

1070. Iris bucharica Foster

Synonyms: Juno bucharica (M. Foster) Vved.



Phytogeographical element: E, I-T Habitat: Steppes, thermophilous shrubs

Elevational range: 600 - 1800 Flowering period: IV to V

Remarks: Cryptophyte; plant 15–40 cm high; stem with (1–)2–4 flowers; tepals 3.5–4.5 cm long, yellow; perianth

tube 3.5–4.5 cm long, greenish–yellow.

Usefulness: Orn.

1071. Iris darwasica Regel

Synonyms: Iris suworowii Regel



Phytogeographical element: E, I-T Habitat: Steppes, xeric shrubs Elevational range: 1500 - 2800 Flowering period: IV to V

Remarks: Cryptophyte; plant 20–35 cm high; stem erect with two flowers; tepals violet, with clear veins, outer

tepals obtuse at apex. Usefulness: Orn.





















1072. Iris halophila Pall. var. sogdiana (Bunge) Grubov

Synonyms: Iris sogdiana Bunge, Xyridion sogdianum (Bunge) Nevski



Phytogeographical element: I-T

Habitat: River beds, riverside forests, meadows

Elevational range: 500 - 2200 Flowering period: V to VI

Remarks: Cryptophyte; plant (20-)40-60 cm high; perianth tube ca. $1.5 \times$ shorter than tepals; tepals not bearded; capsule (1.5-)3-4 mm with beaked apex and 6

sharply protruding ribs.

Usefulness: Orn.

1073. Iris hoogiana Dykes

Synonyms: Iris splendens O. Fedtsch.



Phytogeographical element: E, I-T Habitat: Xeric shrubs, forbs Elevational range: 1500 - 3000 Flowering period: V to VII

Remarks: Cryptophyte; plant 25-70 cm high; stem erect,

with two flowers; tepals pale purple.

Usefulness: Orn.

1074. Iris korolkowii Regel



Phytogeographical element: SE, I-T Habitat: Steppes, xeric shrubs Elevational range: 1100 - 2300 Flowering period: V to VI

Remarks: Cryptophyte; plant 30–40 cm high; stem with 2 flowers; tepals 6.5–8 cm long, $2.5 \times$ longer than perianth

tube.

Usefulness: Orn.

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1075. Iris loczyi Kanitz

Synonyms: Cryptobasis loczyi (Kanitz) Ikonn., Iris tianschanica (Maxim.) Vved. ex Woronow



Phytogeographical element: I-T Habitat: Screes, alpine steppes Elevational range: 2250 - 4350 Flowering period: V to VII

Remarks: Cryptophyte; plant up to 35 cm high, forming hard tussocks; leaves linear, 20–40 cm long and ca. 3 mm wide, rigid; flowering stems not or only slightly emerging above ground; flowers pale violet.

Usefulness: Orn.

1076. Iris narbutii O. Fedtsch.

Synonyms: Juno narbutii (O. Fedtsch.) Vved.



Phytogeographical element: SE, I-T

Habitat: Forbs

Elevational range: 600 - 2100 Flowering period: III to IV

Remarks: Cryptophyte; plant 5–10 cm high; stem internodes not visible during blooming; internal tepals 2.5–3.5 cm long, ca. 1.5 × shorter than external tepals.

Usefulness: Orn.

1077. Iris nicolai (Vved.) Vved.

Synonyms: Juno nicolai Vved.



Phytogeographical element: I-T Habitat: Steppes, xeric shrubs Elevational range: 900 - 1900 Flowering period: I to IV

Remarks: Cryptophyte; plant up to 20 cm high; perianth tube 8–15 cm long; flowers pale pinkish-purple; external

tepals with dark purple stain at the tip.

Usefulness: Orn.











1078. Iris stolonifera Maxim.

Synonyms: Iris leichtlinii Regel



Phytogeographical element: E, I-T

Habitat: Steppes

Elevational range: 800 - 2200 Flowering period: V to VI

Remarks: Cryptophyte; plant 25–70 cm high; stem erect,

with two, violet-brown flowers.

Usefulness: Orn.

1079. Ixiolirion tataricum (Pall.) Schult. & Schult. f.

Synonyms: Ixiolirion tataricum (Pall.) Herb., Amaryllis tatarica



Phytogeographical element: I-T, E-S Habitat: Juniper forests, steppes Elevational range: 380 - 2300 Flowering period: IV to V

Remarks: Cryptophyte; plant 10–40 cm high; corms ovoid; basal leaves usually 3–8, linear; inflorescence an umbel or short raceme, 3–6-flowered; perianth azure to dark violet or light blue; perianth segments spreading, free, sometimes laxly connivent proximally into a pseudotube; filament purple; anther basifixed.

Usefulness: Med.

1080. Juglans regia L.

Synonyms: Juglans fallax Dode, J. regia subsp. fallax (Dode) Popov



Phytogeographical element: I-T, M, Orient

Habitat: Broad-leaved forests Elevational range: 1000 - 2400 Flowering period: IV to V

Remarks: Megaphanerophyte; Trees up to 25 m high; leaves 25–30 cm with 5–9 leaflets; leaflets abaxially glabrous except in axils of midvein and secondary veins, margin entire to minutely serrulate; nuts 4–6 cm, 4-chambered at base; husk irregularly dehiscent; nut shell wrinkled, without prominent ridges.

Usefulness: Foo, Orn.

1081. Juncus articulatus L.

Synonyms: *Juncus geniculatus* Schrank, *J. lampocarpus* Ehrh. ex Hoffm., *J. subarticulatus* Zak. & Novopokr.



Phytogeographical element: Plurireg

Habitat: River beds, fens and mires, littoral vegetation

Elevational range: 350 - 4000 Flowering period: VI to VIII

Remarks: Cryptophyte; plant (10–)15–50(–80) cm high; stem terete with 2-6 cauline leaves; leaves linear transversely 15–25 septate-nodose, 1–2 mm broad; basal sheaths usually brownish, auricled; inflorescence terminal, often branched, with many shortly stalked, semiglobose heads 5–10 mm across, with (4)6–10(–12) flowers each; flowers (2–)2.5–3 mm long, brownish to greenish, sessile; capsules oblong-ovoid abruptly beaked.













1082. Juncus bufonius L.

Synonyms: Juncus erythropodus V.I. Krecz.



Phytogeographical element: Plurireg

Habitat: River beds, fields Elevational range: 900 - 3500 Flowering period: V to IX

Remarks: Therophyte; plant (3-)5-30(-50) cm long; stem branched, slender usually with several basal leaves and one cauline leaf; leaves usually 1-5 cm \times 1-1.15 mm, setaceous or filiform, with a non-auricled broader sheathing base, deeply channeled; inflorescence a much branched to subsimple panicle, with distantly placed (2-)3-5 (or more) flowers on each branch; individual flower subtended by a pair of short, hyaline bracteoles at the base.

1083. Juncus heptopotamicus V.I. Krecz. & Gontsch.



Phytogeographical element: I-T Habitat: Fens and mires Elevational range: 2400 - 2500 Flowering period: VI to VII

Remarks: Cryptophyte; plant 10–30 cm high; rhizome creeping; stems terete with 2–4 basal leaves; leaf sheath 3–6 cm; leaf blade linear, slightly flattened or margin involute and seemingly narrower and channeled, apex acute; inflorescences 1.5–3 cm, 2–5-branched; involucral bract longer than inflorescence; flowers in clusters of 2–5, yellowish green, apex obtuse; capsule trigonous ellipsoid to trigonous ovoid-oblong.

1084. Juncus inflexus L. subsp. brachytepalus (Trautv. ex V.I. Krecz. & Gontsch.) Novikov

Synonyms: *Juncus brachytepalus* V. Krecz. & Gontsch., *J. inflexus* var. *brachytepalus* (Trautv. ex V. Krecz. & Gontsch.) Kitam.



Phytogeographical element: I-T Habitat: Fens and mires, salt marshes

Elevational range: 600 - 3000 Flowering period: VI to VII

Remarks: Cryptophyte; plant 50–90 cm high, gray-green; stems leafless, with only one orange-red leaf sheath at the

base; inflorescence with branch.

1085. Juncus nastanthus V. Krecz. & Gontsch.

Synonyms: *Juncus bufonius* L. subsp. *nastanthus* (V.I. Krecz. & Gontsch.) Sóo, *J. hybridus* Brot. subsp. *nastanthus* (V.I. Krecz. & Gontsch.) Novikov



Phytogeographical element: I-T, E-S Habitat: River beds, fens and mires Elevational range: 800 - 2600 Flowering period: V to VIII

Remarks: Therophyte; plant 4–15 cm high; stems numerous, spreading or ascending; apical leaves often longer than inflorescences; flowers 4–6 mm long, mostly

2–3 together.





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1086. Juncus rigidus Desf.

Synonyms: Juncus nevskii V. Krecz. & Gontsch.



Phytogeographical element: I-T

Habitat: River beds, salt marshes, littoral vegetation

Elevational range: 350 - 400 Flowering period: V to VI

Remarks: Cryptophyte; plant 50–80 cm high; plant dense, bluish-green; leaf sheaths brick-brown; inflorescence lateral; flowers 2–3, greenish or straw-yellow; capsule up

to 4 mm, oblong-ovate, longer than perianth.

1087. Juncus thomsonii Buchenau



Phytogeographical element: I-T

Habitat: Riverside forests, fens and mires

Elevational range: 2600 - 4200 Flowering period: VII to VIII

Remarks: Cryptophyte; plant tufted (5–)10–20(–30) cm high; stems with usually 2 sub-basal leaves; leaf sheath reddish brown, acute, membranous; leaf blade linear, 1–10 cm; inflorescences terminal, head solitary, 5–10 mm in diameter, 2–8-flowered; bracts 3 or 4, spreading outward; stamens longer than perianth; capsule reddish

brown to dark brown, trigonous ellipsoid.

1088. Triglochin maritima L.

Synonyms: Triglochin maritimum L.



Phytogeographical element: Plurireg

Habitat: Meadows, fens and mires, salt marshes

Elevational range: 2700 - 4400 Flowering period: V to VI

Remarks: Cryptophyte; plant 10–80 cm high; all 6 carpels fertile; flowers densely arranged; capsule 3–5 mm, oblong-

ovoid, rounded at base.

Usefulness: For.

1089. Triglochin palustris L.

Synonyms: Triglochin palustre L., Triglochin komarovii Lipsch. & Pavl.



Phytogeographical element: Plurireg Habitat: Meadows, fens and mires Elevational range: 400 - 3200 Flowering period: VI to VII

Remarks: Cryptophyte; plant 10-60 cm high; only 3 carpels fertile; flowers laxly arranged; capsule 6-7 mm, clavate,

tapering at base. Usefulness: For.

1090. Clinopodium graveolens subsp. rotundifolium (Pers.) Govaerts

Synonyms: Acinos rotundifolius Pers.



Phytogeographical element: I-T, E-S Habitat: Steppes, screes, xeric shrubs Elevational range: 350 - 2100

Flowering period: V to VI

Remarks: Therophyte; plant 5–12 cm high; leaves 1–2 cm long, 0.4-1 cm wide, oblong-rhomboid, apex acute; calyx 8–9 mm long, veins hairy; corolla 5.5–6.5 mm long, pink.

1091. Clinopodium integerrimum Boriss.



Phytogeographical element: I-T

Habitat: Broad-leaved forests, riverside forests

Elevational range: 1200 - 2500 Flowering period: V to VII

Remarks: Cryptophyte; plant 17-43 cm high; calyx 6–9 mm long, with 14 veins; corolla 0.9–1.2 cm long;

inflorescences head shaped.









1092. Dracocephalum bipinnatum Rupr.



Phytogeographical element: I-T Habitat: Screes, alpine steppes Elevational range: 1700 - 3900 Flowering period: VII to VIII

Remarks: Cryptophyte; plant 15–30 cm high; middle cauline leaves pinnatisect to pinnately lobed; calyx pubescent, ciliate, golden glandular, conspicuously 2-lipped.

1093. Dracocephalum diversifolium Rupr.



Phytogeographical element: E, I-T Habitat: Rocks, screes, steppes Elevational range: 1900 - 3600 Flowering period: VII to VIII

Remarks: Cryptophyte; plant 19–40 cm high; leaves ovate to lanceolate, entire or crenate unequaly dentate; inflorescensce 2–5 cm long; calyx 1.5-1.7 cm; corolla pink

or bluish-pink; nutlets 4.2–5 mm, wide-elliptic.

Usefulness: For.

1094. Dracocephalum heterophyllum Benth.

Synonyms: Dracocephalum pamiricum Briq.



Phytogeographical element: I-T Habitat: River beds, screes Elevational range: 3400 - 4300 Flowering period: VII to IX

Remarks: Cryptophyte; plant 10–15(–30) cm high; leaf blade broadly to narrowly ovate, base cordate, margin shallowly crenate or serrate, ciliolate; teeth of upper cauline leaves spinescent, apex obtuse to rounded; bracts 3–8-spinescent-serrate; calyx conspicuously 2-lipped to ca. 1/2 its length, greenish, sparsely pubescent.

Usefulness: Foo.

1095. Dracocephalum imberbe Bunge

Synonyms: Dracocephalum laniflorum Rupr.



Phytogeographical element: I-T Habitat: Loose sandy screes, screes Elevational range: 2200 - 4200 Flowering period: VII to VIII

Remarks: Cryptophyte; plant up to 25 cm high; basal leaves numerous; cauline leaves 2–6-paired, ovate to reniform, sparsely pubescent along veins, base cordate, margin undulate-crenate; verticillasters crowded in capitula; calyx conspicuously 2-lipped to ca. 1/4 its length, pubescent to silky-villous, margin white ciliate; middle tooth of upper lip same shape as lateral teeth.

Usefulness: Med, Orn.

1096. Dracocephalum komarovii Lipsky

Synonyms: Dracocephalum butkovii Krassovskaja



Phytogeographical element: E, I-T

Habitat: River beds, loose sandy screes, screes, steppes

Elevational range: 2300 - 3600 Flowering period: VI to VIII

Remarks: Chamaephyte; plant 10–25 cm high, pubescent with long, curly hairs; bracts linear or lanceolate with entire margins; calyx 1–1.3 cm; corolla witish-yellow or white; nutlets 4.5–5 mm, oblong, triple, cut off at the top.

Usefulness: Med, Foo.

1097. Dracocephalum nodulosum Rupr.



Phytogeographical element: I-T

Habitat: Alpine meadows, steppes, xeric shrubs

Elevational range: 1700 - 2900 Flowering period: VI to VIII

Remarks: Cryptophyte; plant 10–30 cm high; stem ascending purplish at apex; petiole much shorter than blade; leaf blade ovate, pubescent especially along veins; verticillasters in subellipsoid spikes; calyx inconspicuously 2-lipped; middle tooth of upper lip ca. 2 wider than lanceolate lateral teeth, teeth of lower lip lanceolate; middle lobe of lower lip not

spotted; corolla densely pubescent outside.

Usefulness: Foo.















1098. Dracocephalum nutans L.

Synonyms: Dracocephalum nutans subsp. subarctium Kuvajev



Phytogeographical element: Plurireg Habitat: Alpine meadows, coniferous forests

Elevational range: 1600 - 3300 Flowering period: VI to VIII

Remarks: Cryptophyte; plant 16–55 cm high; stems densely retrorse puberulent at apex, sparsely puberulent or glabrate basally; leaf blade broadly ovate, pubescent; bracts elliptic to obovate, margin entire, ciliate, apex acute; calyx purplish, veins pubescent, margin ciliate, indistinctly 2-lipped 1/4–1/3 its length; upper lip of corolla slightly shorter than lower lip.

1099. Dracocephalum oblongifolium Regel



Phytogeographical element: I-T

Habitat: River beds, alpine meadows, loose sandy screes,

screes

Elevational range: 2200 - 4100 Flowering period: VII to VIII

Remarks: Cryptophyte; plant 10–20 cm high; leaves 0.8–2.5 cm long, 0.5–1 cm wide, wrinkled, wrapped inside;

corolla dark blue. Usefulness: Orn.

1100. Dracocephalum origanoides Steph. ex Willd.

Synonyms: Dracocephalum origanoides Steph.



Phytogeographical element: EI-T, E-S Habitat: Alpine swards, alpine meadows

Elevational range: 1600 - 3500 Flowering period: VI to VIII

Remarks: Cryptophyte; plant up to 7 cm high; stems purplish, densely retrorse pubescent; leaf blade pinnatipartite, adaxially pubescent, abaxially densely white tomentulous; apex of bracts 3-toothed, rarely entire, pubescent, ciliate; calyx pubescent, ciliate, 2-lipped to 1/2 its length; corolla up to 12 mm.

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1101. Dracocephalum paulsenii Briq.



Phytogeographical element: I-T

Habitat: Alpine steppes, moraines and snow-beds

Elevational range: 2700 - 5000 Flowering period: VII to VIII

Remarks: Cryptophyte; plant up to 5 cm high, caespitose with a thick branched woody rootstock; stems with a spreading eglandular pilose indumentum; leaf margins deeply crenate to pinnatifid, revolute, canescent above, whitish tomentose below, eglandular; inflorescence a dense terminal ovoid head; upper lip of calyx with a broad ovate median lobe clearly larger than lateral.

Usefulness: Med, Foo.

1102. Dracocephalum scrobiculatum Regel



Phytogeographical element: SE, I-T Habitat: Rocks, screes, steppes Elevational range: 2900 - 3800 Flowering period: VII to VIII

Remarks: Chamaephyte; plant 10–20 cm high; leaves oblong, oblong-lanceolate, 1–2.5 cm long and 1.5–5 mm wide, edges wrapped inside; upper leaves violet in middle; calyx 1.8–1.9 cm; corolla pink; nutlets 5–6 mm, oblong, winged along the ribs, above with membranous appendage.

Usefulness: Foo.











1103. Dracocephalum stamineum Kar. & Kir.

Synonyms: Fedtschenkiella staminea (Kar. & Kir.) Kudr.



Phytogeographical element: I-T

Habitat: River beds, screes, moraines and snow-beds

Elevational range: 2800 - 4600 Flowering period: VII to IX

Remarks: Cryptophyte; plant 10–27 cm high, cespitose; stems purple-red, numerous, ascending, unbranched or with a few branches; leaf blade broadly ovate, sparsely pubescent, abaxially golden glandular, base cordate, margin crenate-dentate, apex obtuse; verticillasters in uppermost 1–3 stem nodes, crowded in capitula; floral leaves leaflike, serrate with an apical spine to 3.6 mm; corolla ca. 0.8 cm; stamens long exerted.

Usefulness: Med.

1104. Drepanocaryum sewerzowii (Regel) Pojark.

Synonyms: Nepeta sewerzowii Regel



Phytogeographical element: I-T

Habitat: Juniper forests, steppes, xeric shrubs,

thermophilous shrubs, forbs Elevational range: 500 - 2700 Flowering period: IV to VI

Remarks: Therophyte; plant 8–45 cm high; stems usually unbranched, finely glandular pilose; leaves green or greyish green, sometimes tinged purple, with scattered glandular hairs on both surfaces, sometimes with few sessile oil globules beneath; calyx broad tubular, basally gibbous; corolla scarcely exserted from calyx teeth; nutlets prominently tuberculate, basally clearly concave with a broad ventral areole.

1105. Eremostachys desertorum Regel

Synonyms: Paraeremostachys desertorum (Regel) Adyl., R. Kam. & Machmedov



Phytogeographical element: I-T

Habitat: Screes

Elevational range: 1800 - 2000 Flowering period: IV to V

Remarks: Cryptophyte; plants 20-30 cm high; sparsely white pilose, glandular hairy especially on nodes; basal and stem leaves pilose especially on veins abaxially, corrugate adaxially; spikes interrupted toward base; verticillasters many flowered;

calyx teeth with a soft apical spine.

Usefulness: Orn.

1106. Eremostachys isochila Pazij & Vved.



Phytogeographical element: E, I-T Habitat: River beds, screes, steppes Elevational range: 400 - 1200 Flowering period: V to VI

Remarks: Cryptophyte; plant 30–40 cm high; plant densely pubescent; calyx campanulate or broadly campanulate, 2.5–3 cm long, with an apical spine 2–4 mm long.

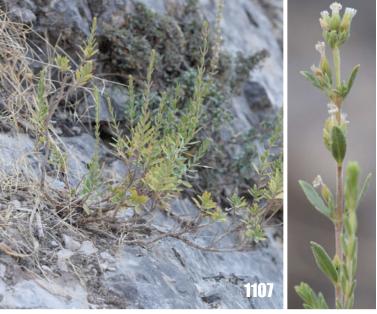
Usefulness: Orn.







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1107. Gontscharovia popovii

(B. Fedtsch. & Gontsch.) Boriss.

Synonyms: Micromeria gontscharovii Vved., M. popovii (B. Fedtsch. & Gontsch.) Vved., Satureja popovii B. Fedtsch. & Gontsch.



Phytogeographical element: I-T

Habitat: Rocks

Elevational range: 400 - 1800 Flowering period: VI - VIII

Remarks: Chamaephyte; plant 20–45 cm high; stems with a glandular indumentum of very short spreading or retrorse hairs; leaves with reddish punctate glands; verticillasters forming elongated spikes 7–15 cm long; calyx ca. 4 mm long, with spreading short hairs and red punctate glands; corolla white or pale rose, 5–6.5 mm long.

1108. Hypogomphia bucharica Vved.

Synonyms: Hypogomphia purpurea (Regel) Vved. ex Koczk.



Phytogeographical element: E, I-T

Habitat: Fields, steppes, thermophilous shrubs, forbs

Elevational range: 500 - 1700 Flowering period: III - V

Remarks: Therophyte; plant 8–55 cm high; verticillasters distant; corolla pink, 2.2–2.7 cm long, upper lip strongly

tilted.

1109. Hypogomphia turkestana Bunge

Synonyms: Hypogomphia elatior (Regel) Vass.



Phytogeographical element: I-T

Habitat: Meadows, steppes, thermophilous shrubs, forbs

Elevational range: 400 - 1100 Flowering period: IV - V

Remarks: Therophyte; plant 6–44 cm high; verticillasters connected; corolla white, 1.1–1.5 cm long; upper lip

slightly tilted.

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Lamiaceae

1110. Hyssopus seravschanicus (Dubj.) Pazij

Synonyms: Hyssopus ferganensis Boriss., H. officinalis L. var. seravschanicus Dubj., H. tianschanicus Boriss.,



Phytogeographical element: I-T

Habitat: Rocks, screes, alpine steppes, forbs

Elevational range: 1200 - 3000 Flowering period: VI - VIII

Remarks: Chamaephyte; plant 19–50 cm high; calyx 7–8 mm long, dark violet; corolla 1–1.2 cm long, bluish-

violet.

Usefulness: Med, Hou.

1111. Kudrjaschevia jacubi (Lipsky) Pojark.

Synonyms: Nepeta jacubi Lipsky



Phytogeographical element: I-T Habitat: Screes, steppes Elevational range: 2100 - 3200 Flowering period: VI - VII

Remarks: Therophyte; plant 9–30 cm high; leaves lanceolate, broadly lanceolate or oblong-ovate, margins entire or dentate (with 3–5 teeth); calyx 4–5 mm long.

1112. Kudrjaschevia korshinskyi (Lipsky) Pojark.

Synonyms: Kudrjaschevia allotricha Pojark., Nepeta korshinskyi Lipsky



Phytogeographical element: E, I-T Habitat: Screes, steppes

Elevational range: 1700 - 3600 Flowering period: VI - VII

Remarks: Cryptophyte; plant 20–40 cm high; leaves crowded at the bottom of the stem, oblong-obovate, on both sides covered with short, straight and glandular

hairs, serrate; calyx 7-9 mm long.

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1113. Lagochilus kschtutensis Knorring

Synonyms: Lagochilus kschtutensis subsp. pubescens R. Kam. & Zuckerwanik



Phytogeographical element: E, I-T

Habitat: Steppes

Elevational range: 1000 - 3000 Flowering period: VI - IX

Remarks: Chamaephyte; plant 15–25 cm high; calyx 1.2–1.5 cm long, calyx teeth shorter than tube.

Usefulness: Med.

1114. Lagochilus paulsenii Briq.

Synonyms: Lagochilus diacanthophyllus (Pall.) Benth. var. paulsenii (Briq.) Knorring



Phytogeographical element: I-T

Habitat: Steppes

Elevational range: 1700 - 2700

Flowering period: VIII

Remarks: Chamaephyte; plant 25–50 cm high; calyx 2.8–3.2 cm long, with 4 teeth; teeth 1.8–2 cm long.

1115. Lagochilus seravschanicus Knorring

Synonyms: Lagochilus schugnanicus Knorring



Phytogeographical element: I-T

Habitat: Loose sandy screes, screes, steppes, xeric shrubs

Elevational range: 1600 - 3900 Flowering period: V - VIII

Remarks: Chamaephyte; plant 12–45 cm high; calyx

2.2-3 cm long, with 5 teeth; teeth 1.2-1.8 cm long, almost equal.

Usefulness: Med.

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Lamiaceae

1116. Lallemantia royleana (Benth.) Benth.

Synonyms: *Dracocephalum inderiense* Less. ex Kar. & Kir., D. royleanum Benth., Nepeta erodiifolia Boiss.



Phytogeographical element: I-T, E-S

Habitat: Broad-leaved forests, steppes, thermophilous

shrubs, forbs

Elevational range: 500 - 2700 Flowering period: IV - VIII

Remarks: Therophyte; plant 15–20 cm high; leaf blade ovate, sparsely pubescent, base cuneate, margin crenate, apex obtuse; verticillasters in terminal spikes; calyx tubular, 5–7 mm long, spreading pubescent, puberulent, sometimes intermixed with yellow glands, veins conspicuous; corolla 5 mm long; nutlets adaxially ribbed, glabrous.

Usefulness: Med.

1117. Lamium album L.

Synonyms: Lamium dumeticola Klokov, L. turkestanicum Kuprian.



Phytogeographical element: Plurireg

Habitat: Broad-leaved forests, riverside forests, forbs

Elevational range: 1200 - 3000 Flowering period: V - VIII

Remarks: Cryptophyte; plant 20–60 cm high; upper leaf blade ovate to ovate-lanceolate; floral leaves similar to cauline leaves but subsessile; corolla tube with hairy annulus near base inside; anthers black-purple, villous.

Usefulness: Foo.











1118. Lamium amplexicaule L.

Synonyms: Lamium stepposum Kossko ex Klokov



Phytogeographical element: Plurireg

Habitat: Juniper forests, broad-leaved forests, fields, steppes, xeric shrubs, thermophilous shrubs

Elevational range: 500 - 3000 Flowering period: III - VII

Remarks: Therophyte; plant up to 30 cm high; leaf blade circular to reniform; corolla without hairy annulus inside;

anthers hirsute, with orange pollen.

Usefulness: Med, Ind.

1119. Leonurus turkestanicus V.I. Krecz. & Kuprian.

Synonyms: *Leonurus cardiaca* L. subsp. *turkestanicus* (V.I. Krecz. & Kuprian.) Rech. f.



Phytogeographical element: I-T

Habitat: Broad-leaved forests, steppes, xeric shrubs, forbs

Elevational range: 1100 - 3500 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 70–150(–200) cm high; leaves numerous; lower stem leaves not early deciduous; lobes broadly cuneate, lobules broadly lanceolate; calyx with 5 veins, anterior teeth of calyx dilated in flower.

Usefulness: Med, Foo.

1120. Lophanthus ouroumitanensis (Franch.) Kochk. & Zuckerw.

Synonyms: *Lophanthus lipskyanus* Ikonn. Gal. & Nevski, *Nepeta ouroumitanensis* Franch., *L. schtschurowskianus* (Regel) Lipsky var. *kulabensis* Lipsky



Phytogeographical element: I-T

Habitat: Juniper forests, xeric shrubs, forbs

Elevational range: 1800 - 3600 Flowering period: VI - VII

Remarks: Cryptophyte; plant 30–70 cm high; leaves ovate-cordate or oblong-ovate, apex acute; verticillasters on long peduncles; corolla tube 1–1.1 cm long; calyx 8–10 mm,

teeth $3-4 \times$ shorter than calyx tube.

1121. Lophanthus subnivalis Lipsky

Synonyms: Lophanthus tomentosus Regel, Nepeta newesskyi Lipsky



Phytogeographical element: E, I-T Habitat: River beds, rocks, screes Elevational range: 2200 - 3600 Flowering period: VII - IX

Remarks: Cryptophyte; plant 10–50 cm high, white pubescent; leaves ovate, apex obtuse; two stamens

protrude distinctly from corolla.



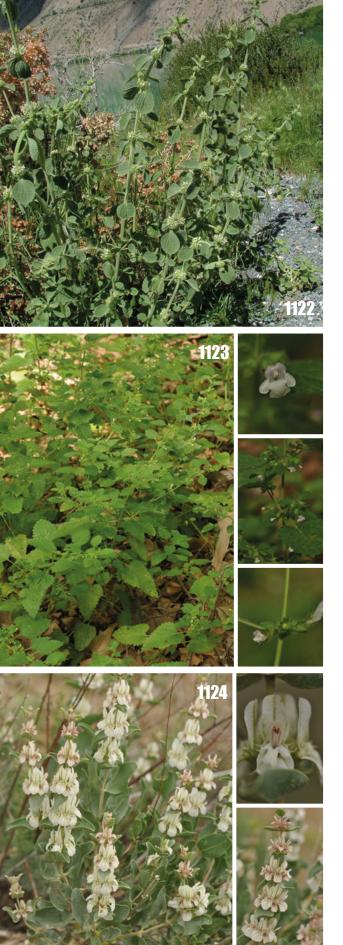












1122. Marrubium anisodon C. Koch



Phytogeographical element: I-T, M

Habitat: River beds, ruderal, fields, xeric shrubs,

thermophilous shrubs Elevational range: 700 - 2800 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 30-40 cm high; leaves reduced upward, adaxially polished, abaxially densely scabrid strigose-villous; calyx 10-veined, teeth 10, main 5 long, alternate with to 5 accessory teeth, 1-4 mm, subulate, hooked; corolla white, ca. 9 mm.

Usefulness: Med.

1123. Melissa officinalis L.

Synonyms: Melissa bicornis Klokov



Phytogeographical element: I-T, M

Habitat: Broad-leaved forests, riverside forests, orchards and

gardens

Elevational range: 600 - 1800 Flowering period: VI - VII

Remarks: Cryptophyte; plant 35–90 cm high; leaf blade ovate, adaxially villous, abaxially villous along veins; calyx villous outside, villous inside apically, with upper lip short 3-denticulate or undulate, lower lip slightly longer than upper; corolla creamy white, villous outside.

Usefulness: Med, Foo, Hou.

1124. Moluccella fedtschenkoana (Kudr.) Ryding

Synonyms: Otostegia fedtschenkoana Kudr.



Phytogeographical element: E, I-T Habitat: Loose sandy screes Elevational range: 500 - 1800 Flowering period: V - VI

Remarks: Chamaephyte; plant 50–100 cm high; bracts are equal to the tube of calyx or longer, oval or wide elliptical,

calyx 2–3 cm long.

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Lamiaceae

1125. Moluccella olgae (Regel) Ryding

Synonyms: Otostegia olgae (Regel) Korsh.



Phytogeographical element: I-T Habitat: Screes, steppes Elevational range: 1100 - 1800 Flowering period: V - VII

Remarks: Nanophanerophyte; plant up to 1 m high; leaves lanceolate $2.5-7.5 \times 1-2.7$ cm, rounded at the base, pubescent abaxially; flowers sessile, 1.5-1.8, two-lipped, whitish or cream-colored; sepals 2-2.5 cm long with decorative creamy lobes, pubescent abaxially and reticulate; whorls 5-6-flowered, bracts rigid, tricuspidate.

1126. Nepeta bracteata Benth.

Synonyms: Nepeta globifera Bunge



Phytogeographical element: Lamiaceae, I-T

Habitat: Screes, alpine steppes Elevational range: 1800 - 3000 Flowering period: VI - VII

Remarks: Therophyte; plant 5–12 cm high; leaves and petioles pubescent with short hairs; flowers at top of stems and branches in dense capitula, with compact verticillasters; calyx on fruits ca. 9 mm long; calyx teeth 1.5–3 mm long; nutlets ca. 1.5 mm long.

1127. Nepeta cataria L.



Phytogeographical element: Plurireg

Habitat: Broad-leaved forests, meadows, steppes, xeric shrubs, forbs

Elevational range: 1400 - 2300 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 40–150 cm high; stems white pubescent; leaf blade ovate to triangular-cordate, adaxially yellow-green, hirtellous, abaxially whitish pubescent especially on veins; flowers in cymes; calyx tubular, white pubescent; middle lobe of lower corolla lip concave, margin with incurved lobes or teeth, not swollen, base villous.

Usefulness: Med, Foo, Hou.

































1128. Nepeta daenensis Boiss.



Phytogeographical element: I-T

Habitat: River beds, xeric shrubs, thermophilous shrubs

Elevational range: 2100 - 4000 Flowering period: V - VIII

Remarks: Therophyte; plant (2.5–) 4–25 cm high; stem purplish, with very short papillose-eglandular and glandular hairs; leaves few, linear-elliptic, entire or with few small teeth; calyx on fruits ca. 6 mm long; nutlets 1.2–1.3 mm long, elliptic.

1129. Nepeta floccosa Benth.

Synonyms: Nepeta pseudofloccosa Pojark., N. vakhanica Pojark.



Phytogeographical element: I-T Habitat: River beds, rocks, screes Elevational range: 2800 - 3700

Flowering period: VIII

Remarks: Cryptophyte; plant up to 35 cm high; stems with dense, whitish floccose-tomentose hairs, purplish basally; leaves cordate to triangular-cordate, rigid, thick, corrugate, densely white tomentulose and glandular, margin crenulate; verticillasters capitate, 6-8-flowered; calyx violet, sparsely white tomentose, scaly glandular; corolla densely puberulent, glandular; nutlets glabrous. Usefulness: Med.

1130. Nepeta formosa Kudrjasch.



Phytogeographical element: I-T

Habitat: Juniper forests, steppes, xeric shrubs, forbs

Elevational range: 1700 - 3000 Flowering period: VI - VII

Remarks: Cryptophyte; plant up to 120 cm high; leaves green, pubescent with short hairs on both sides, ovate or triangular-ovate, at apex obtuse or acuminate, obtuse or acute crenate-dentate (with 5-20 teeth), at base cordate, 4.5-14 cm long, 2.5-8 cm wide; corolla 1.2-2 cm long; nutlets 1.5-2 mm long, glabrous.

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1131. Nepeta longibracteata Benth.



Phytogeographical element: I-T

Habitat: Rocks, screes, moraines and snow-beds

Elevational range: 3500 - 4900 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 9–12 cm high; lower internodes of stems long, sparsely short hairy, minutely white glandular, upper minutely long hairy and white; leaf softly gray tomentose; inflorescences usually globose;

floral leaves purplish, longer than flowers.

Usefulness: Med.

1132. Nepeta nuda L.

Synonyms: Nepeta pannonica L.



Phytogeographical element: I-T, M, E-S

Habitat: Xeric shrubs, forbs Elevational range: 1300 - 2400 Flowering period: VI - VII

Remarks: Cryptophyte; plants 50–120 cm high; leaves oblong-ovate or oblong-elliptic to lanceolate, adaxially greenish, sparsely puberulent or subglabrous, abaxially pale, pubescent, margin crenate or serrate; cymes (2–)5–11-flowered, in narrow long panicles; nutlets apex

minutely tuberculate, sparsely hairy.

Usefulness: Med, Foo.

1133. Nepeta olgae Regel

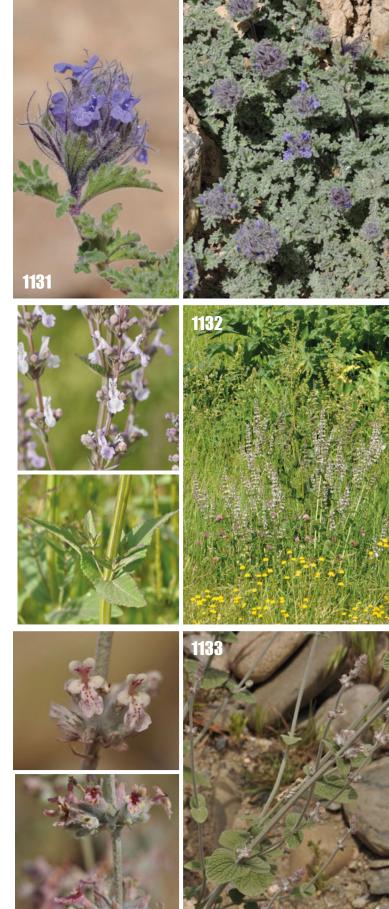


Phytogeographical element: I-T

Habitat: River beds, loose sandy screes, steppes

Elevational range: 600 - 3400 Flowering period: V - VI

Remarks: Cryptophyte; plant 30–80 cm high; leaves wide ovate, cordate or rounded at base, margins finely serrated; corolla 1.1–1.2 cm long, middle lobe of the lower lip wavy.















1134. Nepeta pamirensis Franch.



Phytogeographical element: EI-T Habitat: Screes, alpine steppes Elevational range: 3400 - 4900 Flowering period: VII - IX

Remarks: Chamaephyte; plant 9–25 cm high, covered with dendroid hairs; calyx 6.5–9 mm long; corolla 1.2–1.7 cm long

with 1–1.4 cm tube. Usefulness: Foo.

1135. Nepeta podostachys Benth.

Synonyms: Nepeta maracandia Bunge



Phytogeographical element: I-T Habitat: Steppes, xeric shrubs, forbs Elevational range: 1200 - 4100 Flowering period: VI - VIII

Remarks: Cryptophyte; plant up to 70 cm high; leaves greygreen, on both sides, nearly glabrous or pubescent, lanceolate to rhomboid; flowers at top on stems and branches in verticillasters, gathered in contiguous spiciform inflorescences 3–9 cm long; calyx teeth, linear-lanceolate, equal to calyx tube; bracts almost equal to calyx.

Usefulness: Med, For.

1136. Nepeta pungens Benth.

Synonyms: Nepeta fedtschenkoi Pojark., N. microcephala Pojark., Ziziphora pungens Bunge



Phytogeographical element: I-T Habitat: Screes, steppes Elevational range: 800 - 2500 Flowering period: IV - VII

Remarks: Therophyte; plant 5–25 cm high; stems pubescent, apex with short-stalked or sessile glands; cauline leaf blade ovate, adaxially olive green, sparsely puberulent, abaxially pubescent; cymes 3–5-flowered, 2 or 3 upper pairs sessile, in dense ovoid capitula; calyx throat subregular, teeth straight, subequal; stamens arcuate-ascending under upper lip of corolla; nutlets smooth, shiny.

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1137. Nepeta saturejoides Boiss.



Phytogeographical element: I-T

Habitat: River beds, loose sandy screes, steppes, xeric

shrubs

Elevational range: 900 - 3000 Flowering period: VI - IX

Remarks: Therophyte; plant 5–55 cm high; stems ascending or upright, branching nearly from base, violet; leaves grey-green, linear- lanceolate, lanceolate or ovate, apex acuminate, spaced acute-dentate (with 1–5 teeth); flowers in dense, few flowered verticillasters, surrounded with bracteal leaves; calyx with sharp incisions between teeth.

1138. Nepeta subhastata Regel

Synonyms: Nepeta knorringiana Pojark.



Phytogeographical element: I-T

Habitat: Rocks

Elevational range: 1500 - 1900 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 13–25 cm high, pubescent; leaves blade ovoid, 1.3–2 × 1.1–1.6 cm, densely puberulent, glandular, base broadly cuneate, margin remotely dentate with 3–4 aristate teeth; cymes 2–5-flowered in 2 to 5 verticillers; bracts ellipticlanceolate 2–3 mm, rigid, glandular, ciliolate; calyx 8–9 mm, 15-veined, villous, glandular; corolla ca. 20–24 mm; nutlets yellow-brown, obovoid, ca. 1.7 1 mm, triangular with 1 rib.



















1139. Nepeta ucranica L.



Phytogeographical element: I-T

Habitat: Steppes

Elevational range: 800 - 2600

Flowering period: IV

Remarks: Cryptophyte; plant 17–50 cm high; stems subglabrous or with upwardly curved, short, simple hairs; leaf blade ovate to lanceolate or narrowly lanceolate, adaxially gray-blue, glabrous or sparsely appressed puberulent, abaxially pale, puberulent, yellowish glandular, veins and margin pubescent; cymes pyramidal, compact; lower lip of corolla directed upward, nearly parallel to upper lip; nutlets densely depressed tuberculate.

1140. Origanum tyttanthum Gontsch.

Synonyms: Origanum vulgare L. subsp. gracile (K. Koch) Ietsw.



Phytogeographical element: SE, I-T

Habitat: Juniper forests, broad-leaved forests, ruderal, steppes,

forbs

Elevational range: 800 - 2700 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 20–80 cm high; bracteal leaves and bracts usually green, rarely slightly violet, leaves glaucous, nearly monochromatic, on both sides with reddish-yellow submerged glands; calyx 2.5–3 mm long; corolla 4–7 mm long,

white to pale-pink. Usefulness: Med, Foo.

1141. Perovskia abrotanoides Kar.



Phytogeographical element: I-T Habitat: Screes, steppes Elevational range: 1000 - 2600 Flowering period: VI - VIII

Remarks: Cryptophyte; plant up to 1(–1.5) m high, aromatic; stems and leaves with a prominent indumentum of small adpressed dendroid-stellate hairs and numerous sessile oil globules; leaves bipinnatisect, with linear or linear-oblong ultimate segments; inflorescence showy, large, much-branched with numerous 2–4(–6)-flowered verticillasters; calyx with a dense indumentum of long villous eglandular hairs; corolla upper lip 4-lobed.

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1142. Perovskia angustifolia Kudrjasch.



Phytogeographical element: I-T Habitat: Screes, steppes Elevational range: 800 - 2900 Flowering period: VI - IX

Remarks: Chamaephyte; plant up to 1.2 m high, green; leaves 1.5–7 cm long, 0.5–3 cm wide, lanceolate; calyx 6–7 cm long, covered by straight hairs; corolla 1.2–1.4 cm

long, inflorescence - branchy panicle.

Usefulness: Med, Orn.

1143. Perovskia virgata Kudrjasch.



Phytogeographical element: E, I-T Habitat: Rocks, loose sandy screes, screes

Elevational range: 1800 - 2900 Flowering period: VI - VIII

Remarks: Chamaephyte; plant up to 80 cm high, graygreen; calyx 5–6 cm long, covered by straight hairs; corolla

1–1.1 cm long. Usefulness: Med, Orn.

1144. Phlomis bucharica Regel



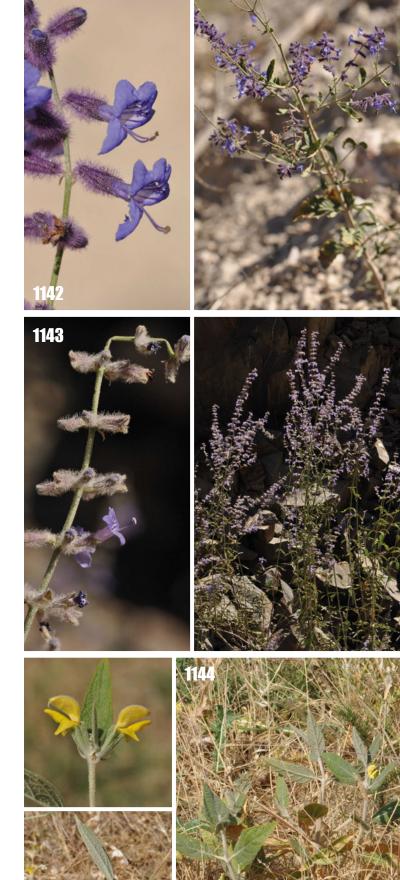
Phytogeographical element: I-T

Habitat: Steppes

Elevational range: 500 - 1900 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 40–60 cm high; densely white tomentose; leaf blades lanceolate 9–13 × 3.5–5 cm, adaxially sparsely minute hispid, abaxially densely tomentose, with apparent veins; verticillasters 2-8 flowered, separate; calyx tubular, stellate tomentose, 16–17 mm; corolla yellow, 26–28 mm, tube 1.4-1.5.

Usefulness: For, Ind.













1145. Phlomis hypoleuca Vved.



Phytogeographical element: I-T Habitat: Steppes, pseudosteppes, screes

Elevational range: 750 - 1850 Flowering period: IV - VI

Remarks: Cryptophyte; plant 40–60 cm high; densely white tomentose; leaf blades lanceolate 9–15 × 2.5–4 cm, adaxially sparsely minute hispid, abaxially densely tomentose, base cuneate, margin entire or minutely serrate; upper stem leaves much reduced; verticillasters many flowered, separate; bracts lanceolate 9–10 mm; calyx tubular, stellate tomentose, 12–14 mm (without teeth); teeth truncate, puberulent 6–14 mm long, apex spinescent; corolla rose-violet, 25–28 mm.

1146. Phlomis salicifolia Regel



Phytogeographical element: I-T Habitat: Loose sandy screes, steppes Elevational range: 700 - 1500 Flowering period: V - VII

Remarks: Cryptophyte; plant 20–50 cm high; lower leaves lanceolate; verticillasters on short stalk 1–2 mm long or nearly sessile; upper lip laterally flattened; corolla lily.

Usefulness: Med.

1147. Phlomis thapsoides Bunge



Phytogeographical element: I-T

Habitat: Screes, fields Elevational range: 1300 - 1700 Flowering period: IV - VII

Remarks: Cryptophyte; plant 30–60 cm high; leaves densely, stellate cordate or ovate, apex acute; upper lip

laterally flattened. Usefulness: For, Hou.

1148. Phlomoides arctifolia (Popov) Adylov, Kamelin & Makhm.

Synonyms: Eremostachys arctiifolia Popov, Phlomis hissarica Regel



Phytogeographical element: E, I-T

Habitat: Steppes

Elevational range: 1100 - 2600 Flowering period: V - VI

Remarks: Cryptophyte; plant 75–130 cm high; leaves densely pubescent on the abaxial side with glands and hairs; bracteoles linear-lanceolate, longer than calyx tube; filament appendages as horizontal scales, located over the ring of

bristles; corolla bicoloured.

Usefulness: Orn.

1149. Phlomoides baldschuanica (Regel) Adylov, Kamelin & Makhm.

Synonyms: Eremostachys baldschuanica Regel, E. trautvetteriana Regel



Phytogeographical element: E, I-T Habitat: Steppes, xeric shrubs, forbs Elevational range: 1800 - 3200 Flowering period: V - VI

Remarks: Cryptophyte; plant 60–90 cm high; basal leaves elliptic, cuneate at base; calyx 18–22 mm long; bracteole

lanceolate, $2 \times$ shorter than calyx.

Usefulness: Orn.

1150. Phlomoides canescens (Regel) Adylov, Kamelin & Makhm.

Synonyms: Phlomis canescens Regel



Phytogeographical element: I-T Habitat: Juniper forests, steppes Elevational range: 2300 - 3000 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 50–75 cm high; leaves abaxially with stellate hairs; upper lip not flattened with dense beard; filaments of posterior stamens usually with appendages.









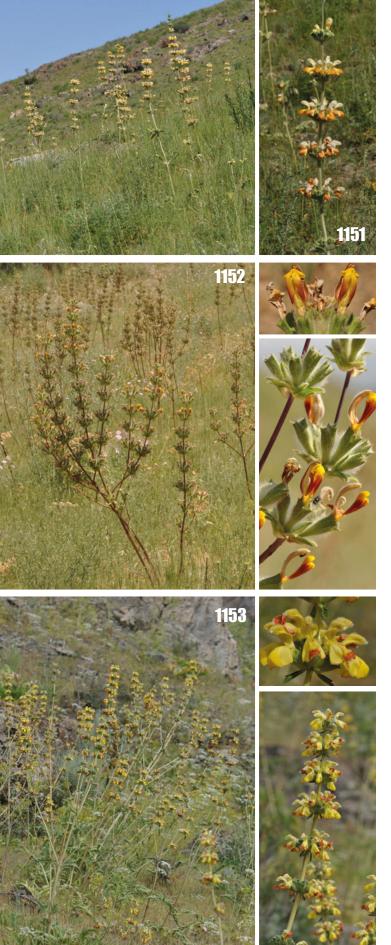












1151. Phlomoides fetisowii (Regel) Adylov, Kamelin & Makhm.

Synonyms: Eremostachys fetisowii Regel



Phytogeographical element: I-T

Habitat: Steppes

Elevational range: 1500 - 2200 Flowering period: V - VII

Remarks: Cryptophyte; plant up to 120 cm high; sparsely white pilose, glandular hairy especially in inflorescence; basal leaf blade ovate 10–20 cm, white pilose especially on veins abaxially, margin irregularly crenate, apex obtuse; spikes interrupted toward base; 9–11 verticillasters with 10–12 flowers; calyx campanulate 1.5–1.7 cm; corolla 3.5–4 cm.

1152. Phlomoides hissarica (Regel) Adylov, Kamelin & Makhm.

Synonyms: Eremostachys hissarica Regel



Phytogeographical element: I-T

Habitat: Steppes, thermophilous shrubs

Elevational range: 600 - 1900 Flowering period: V - VI

Remarks: Cryptophyte; plant 80–150 cm high; verticillasters 8–10-flowered, sesille or 0.5–0.8 mm peduncles; calyx 2.8–3 cm long; corolla 4.5–5 cm long,

brown-red. Usefulness: Orn.

1153. Phlomoides kaufmanniana (Regel) Adylov, Kamelin & Makhm.

Synonyms: Eremostachys adpressa Regel, E. kaufmanniana Regel,



Phytogeographical element: E, I-T

Habitat: Screes

Elevational range: 450 - 2100 Flowering period: V - VI

Remarks: Cryptophyte; plant 60–120 cm high; stems glabrous or sparsely pubescent; calyx 1.3–1.5 cm; corolla

2–2.5 cm. Usefulness: Orn.

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1154. Phlomoides labiosa (Bunge) Adylov, Kamelin & Makhm.

Synonyms: Eremostachys diversifolia Regel, E. labiosa Bunge, E. labiosa var. canescens Regel, E. labiosa var. subvillosa Regel



Phytogeographical element: I-T

Habitat: Steppes

Elevational range: 700 - 1700 Flowering period: IV - V

Remarks: Cryptophyte; plant 20–70 cm high; main or lateral roots tuberous; calyx 1.9–2.4 cm long, covered with a dense indumentum of short stellate-dendroid hairs, corolla 4–4.5 cm long, with lower lip 1.5–2 × larger than upper, yellow.

Usefulness: For.

1155. Phlomoides lehmanniana (Bunge) Adylov, Kamelin & Makhm.

Synonyms: *Eremostachys lehmanniana* Bunge, *E. olgae* Regel, *E. superba* Bunge



Phytogeographical element: E, I-T

Habitat: Forbs

Elevational range: 1300 - 3000 Flowering period: VI - VII

Remarks: Cryptophyte; plant 70–130 cm high; verticillasters 4–6-flowered; bracteole lanceolate, 2–3 joint, equal to or shorter than calyx; calyx 1.9–2.1 long; corolla single-colored, lilac.

Usefulness: Orn.

1156. Phlomoides schugnanica (Popov) Adylov, Kamelin & Makhm.

Synonyms: Eremostachys schugnanica (Popov) Knorring, E. speciosa var. schugnanica Popov



Phytogeographical element: E, I-T Habitat: Screes, steppes Elevational range: 2300 - 4300 Flowering period: V - VII

Remarks: Cryptophyte; plant 10–25 cm high; basal leaves lyrate-pinnatisect; flower verticillasters distant; calyx 2.1–2.2 cm, lobes obtuse, aristate; upper corolla lip shorter than lower.

Usefulness: Orn.































1157. Phlomoides seravschanica (Regel) Adylov, Kamelin & Makhm.

Synonyms: Eremostachys sarawschanica Regel



Phytogeographical element: E, I-T

Habitat: Screes, steppes, moraines and snow-beds

Elevational range: 2200 - 3200

Flowering period: VII

Remarks: Cryptophyte; plant 30–60 cm high; calyx 18–22 mm long; corolla 4–4.5 cm long, discontinuous ring

of bristles inside tube, yellow.

Usefulness: Orn.

1158. Phlomoides speciosa (Rupr.) Adylov, Kamelin & Makhm.

Synonyms: Eremostachys edelbergii Rech. fil., E. speciosa Rupr.



Phytogeographical element: I-T Habitat: Screes, steppes, forbs Elevational range: 1700 - 3900 Flowering period: IV - VIII

Remarks: Cryptophyte; plant 25–50 cm high; basal leaves lyrate-pinnatisect; inflorescences crowded, dense, elliptical or oblong; calyx 2.4–2.6 cm long; upper lip of

corolla equal to the lower.

Usefulness: Foo.

1159. Phlomoides tadshikistanica (B. Fedtsch.) Adylov, Kamelin & Makhm.

Synonyms: Eremostachys tadschikistanica B. Fedtsch.



Phytogeographical element: E, I-T Habitat: Screes, thermophilous shrubs

Elevational range: 1000 - 2100 Flowering period: V - VI

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Remarks: Cryptophyte; plant up to 2 m high; calyx

1.1–1.2 cm long, glabrous.

Usefulness: Orn.

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1160. Prunella vulgaris L.

Synonyms: Prunella hispida Benth.



Phytogeographical element: Plurireg

Habitat: River beds, riverside forests, fens and mires, fields

Elevational range: 800 - 3300 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 15-20(-40) cm high; upper calyx

lip flat with 3 teeth. Usefulness: Med, Foo.

1161. Salvia bucharica Popov

Synonyms: Arischrada bucharica (Popov) Pobed., Schraderia bucharica (Popov) Nevski



Phytogeographical element: I-T

Habitat: Steppes

Elevational range: 800 - 2200 Flowering period: V - VI

Remarks: Chamaephyte; plant 30–60 cm high, clump-forming; leaves pinnate, below with a dense tomentose indumentum of antrorse hairs and numerous sessile oil globules; calyx purplish, much enlarged at fruiting time; nutlets with some

sessile glands at apex. Usefulness: Med, For.

1162. Salvia glabricaulis Pobed.



Phytogeographical element: SE, I-T

Habitat: Steppes, forbs Elevational range: 1200 - 1500 Flowering period: V - VI

Remarks: Cryptophyte; plant 30–40 cm high; leaves pinnately compound; corolla pubescent and glandular on upper lip.











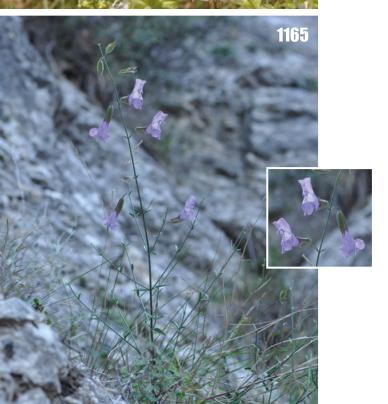












1163. Salvia komarovii Pobed.



Phytogeographical element: E, I-T

Habitat: Steppes

Elevational range: 2000 - 2100 Flowering period: VI - VII

Remarks: Cryptophyte; plant 25–50 cm high; leaves pinnately compound; stem villous; corolla glabrous on

upper lip and tube.

1164. Salvia macrosiphon Boiss.

Synonyms: Salvia kotschyi Boiss.



Phytogeographical element: I-T Habitat: Steppes, forbs Elevational range: 400 - 1700 Flowering period: IV - VI

Remarks: Cryptophyte; plant 20–60 cm high; calyx teeth and bract leaves with long spines; calyx 1.8–2 cm long; calyx upper lip teeth equal; inflorescence loose with

verticillasters in 1.2–4.5 cm distance.

Usefulness: Med.

1165. Salvia margaritae Botsch.



Phytogeographical element: I-T Habitat: Rocks, screes Elevational range: 1500 - 2500 Flowering period: V - VIII

Remarks: Cryptophyte; plant up to 100 cm; eglandular and sparsely pubescent; leaf blade lanceolate, 1.5–2.4 × 0.5–0.8, glabrous, abaxially sparsely fine pilose and glandular; inflorescences densely pilose; verticillasters widely distant, 2–6-flowered, in terminal racemes 8–15 cm; bracts lanceolate 0.4–0.9 cm × 0.5–1.5 mm; calyx tubular, ca. 1.5–2 cm, pilose, glandular; corolla ca. 2.5–3.5 cm, pubescent and glandular outside.

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1166. Salvia nemorosa L.

Synonyms: Salvia deserta Schang.



Phytogeographical element: I-T, E-S Habitat: Meadows, fields, steppes Elevational range: 1200 - 2500 Flowering period: V - VIII

Remarks: Cryptophyte; plant 30–60 cm high; stems eglandular; basal leaves petiolate, oblong, cordate or roundet at base, regularly crenate, more or less pubescent; inflorescence usually dense; bracts as long as or longer than calyx, violet.

1167. Salvia schmalhausenii Regel



Phytogeographical element: E, I-T

Habitat: Steppes

Elevational range: 1800 - 2200 Flowering period: V - VI

Remarks: Cryptophyte; plant 30–60 cm high, stems

numerous.

1168. Salvia sclarea L.



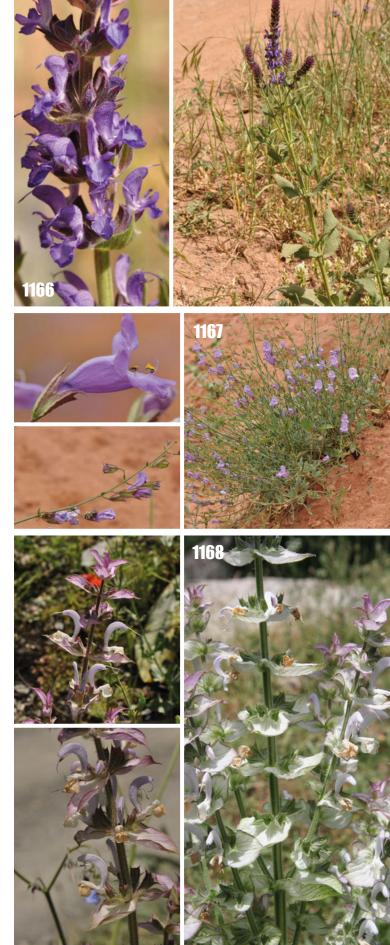
Phytogeographical element: I-T, M

Habitat: River beds, broad-leaved forests, screes, ruderal,

steppes, xeric shrubs Elevational range: 800 - 2500 Flowering period: V - VII

Remarks: Cryptophyte; plant 20–120 cm high; lower stem leaves with large lamina, 8–25 cm long, 5–18 cm wide; bracteal leaves large, up to 3.5 cm long, membranous, pinkviolet or white with greenish veins; calyx 1–1.4 cm long; middle tooth of the upper lip much shorter than laterals.

Usefulness: Med, For, Foo.











1169. Scutellaria adenostegia Briq.

Synonyms: Scutellaria bucharica Juz.



Phytogeographical element: I-T Habitat: Rocks, screes, forbs Elevational range: 800 - 3000 Flowering period: V - VII

Remarks: Cryptophyte; plant 12–35(–40) cm high; leaves up to 3 cm long, on the upper side glabrous, densely pubescent beneath; calyx 2.5–3.5 cm long.

1170. Scutellaria andrachnoides Vved.



Phytogeographical element: I-T

Habitat: Rocks, screes

Elevational range: 1400 - 2100 Flowering period: VI - VII

Remarks: Cryptophyte; plant 4–12 cm high; 2, rarely 3 pairs of pilose leaves; petiole 0.5–2 mm, leaf blade leathery, greyish–green, ovate 0.5–1.5 × 0.3–1.3 cm, margin entire, pubescent; racemes ca. 2 cm, compact; bracts ovate-elliptic, ca. 0.5–1 cm × 2.5–6 mm, membranous, densely villous, glandular; calyx ca. 2 mm, sparsely villous, glandular, scutellum ca. 3 mm; corolla pale pink, whitish, purple spotted on lower lip, ca. 1 cm, pilose, glandular.

1171. Scutellaria baldshuanica Nevski ex Juz.



Phytogeographical element: E, I-T

Habitat: Rocks

Elevational range: 1000 - 1700 Flowering period: VI - VII

Remarks: Chamaephyte; plant 7–21 cm high, covered with long, protruding hairs; leaves broadly ovate or almost orbicular, 0.3–1.2 cm long, with a well defined petiole;

corolla ca. 7 mm long.

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1172. Scutellaria glabrata Vved.



Phytogeographical element: E, I-T

Habitat: Loose sandy screes, screes, steppes

Elevational range: 1500 - 2400 Flowering period: VI - VIII

Remarks: Chamaephyte; plant 10-40 cm high; stem glabrous; upper stem leaves smaller than bracts;

inflorescence short.

1173. Scutellaria hissarica B. Fedtsch.



Phytogeographical element: E, I-T

Habitat: Rocks

Elevational range: 1100 - 1700 Flowering period: VI - IX

Remarks: Chamaephyte; plant 30–50 cm high; stem sparsely pubescent with fine papillary hairs or glabrous; inflorescences pilose with admixture of glandular hairs; calyx oblong, 3-4 mm long and 2.5-3 mm wide, on fruit

up to 8 mm long and ca. 6 mm wide.

1174. Scutellaria immaculata Nevski ex Juz.



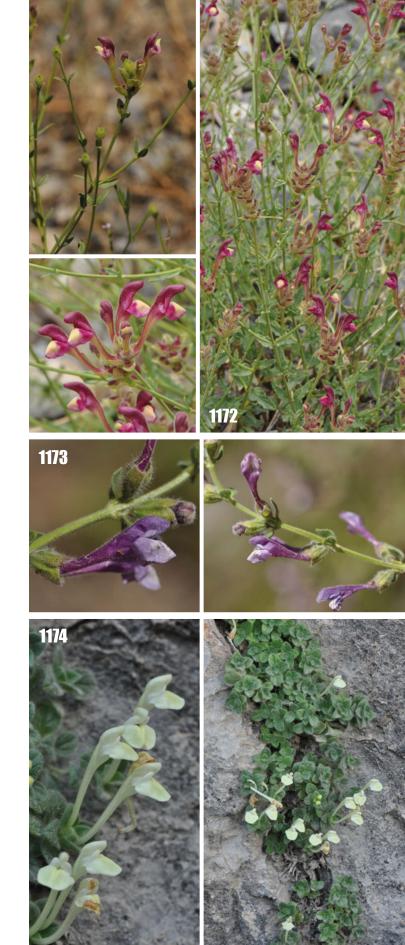
Phytogeographical element: SE, I-T

Habitat: Rocks

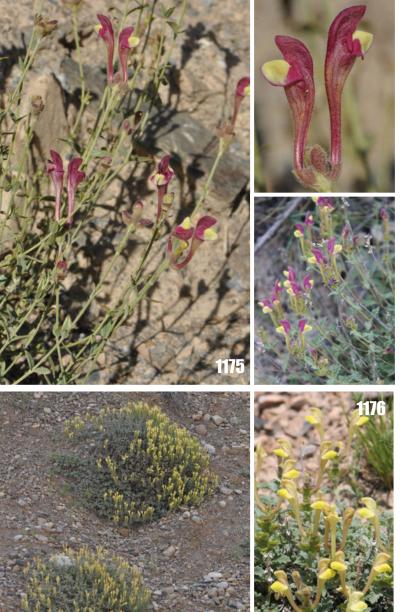
Elevational range: 700 - 2200 Flowering period: IV - VIII

Remarks: Chamaephyte; plant 3–15 cm high; leaves sparsely glandular; corolla 2.5-3 cm long, with tube sparsely glandular on the outside, lower lip without

pattern, flower yellow.



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1175. Scutellaria intermedia Popov



Phytogeographical element: SE, I-T

Habitat: Loose sandy screes, screes, steppes, xeric shrubs

Elevational range: 700 - 2800 Flowering period: VI - VIII

Remarks: Chamaephyte; plant 21–40 cm high; inflorescence composed of several flowers, at the top of the stems; leaves and stems covered with short, curly and

adherent hairs.

1176. Scutellaria iskanderi Juz.



Phytogeographical element: SE, I-T Habitat: Screes, steppes, xeric shrubs Elevational range: 1500 - 3300

Flowering period: V - VII

Remarks: Chamaephyte; plant up to 10 cm high; leaves tomentose, 4–12 cm long, lanceolate or ovate or rhomboid; inflorescence short, 2–5 cm long.

1177. Scutellaria jodudiana B. Fedtsch.

Synonyms: Scutellaria darvasica Juz.



Phytogeographical element: I-T

Habitat: River beds, screes, moraines and snow-beds

Elevational range: 2000 - 4200 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 5–15 cm high, with creeping shoots; inflorescences 2.5–6 cm long; bracts broadly oval

or elliptical, pilose; corolla 1.5–1.6 cm long.

1178. Scutellaria megalodonta Juz.

Synonyms: Scutellaria macrodontha Nevski ex Juz.



Phytogeographical element: E, I-T

Habitat: Rocks

Elevational range: 1500 - 1600 Flowering period: VII - VIII

Remarks: Chamaephyte; plant 4–20 cm high, covered with long, protruding hairs; leaves oblong-ovate to reniform, 1–2.7 cm long, gradually turn into petioles; corolla ca.

10 mm long.

1179. Scutellaria mesostegia Juz.



Phytogeographical element: EI-T Habitat: Screes, steppes Elevational range: 850 - 1850 Flowering period: VI - VII

Remarks: Cryptophyte; plant up to 25 cm high; stems much branched at base, tomentose, reddish; leaves deeply 4–8 pinnatilobed, 7–25 × 4–15 mm, obate–oblong, sparsely hairy adaxially and densely tomentose abaxially; flowers in lax racemes 3–5 cm long, up to 10 cm long in fruit; bracts 8–20 × 4–10 mm, boat–shape with acuminate apex; calyx ca. 33 mm, villous and glandular; corolla 20–28 mm, yellow, turning reddish on upper lobe and dark purple on lateral lobes, densely pubescent and glandular; nutlets ca. 2 mm.

1180. Scutellaria ocellata Juz.

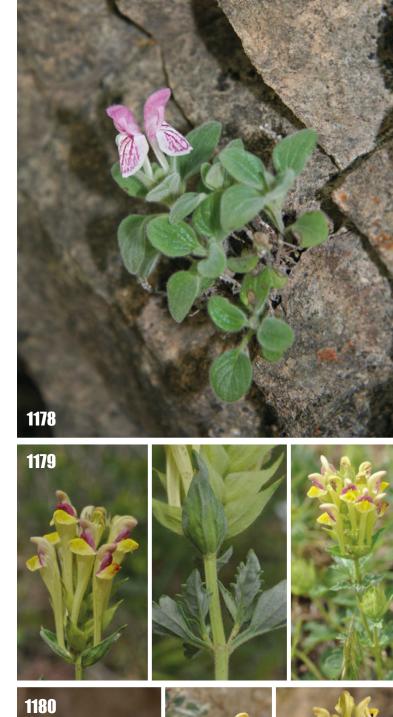


Phytogeographical element: E, I-T Habitat: Loose sandy screes, steppes

Elevational range: 2200 - 3000

Flowering period: VII

Remarks: Chamaephyte; plant 12–25 cm high; leaves on both sides covered with densely long and slightly curly hairs; calyx ca. 3 mm long, corolla 2.8–3.3 cm long.

















1181. Scutellaria oligodonta Juz.



Phytogeographical element: EI-T Habitat: Alpine steppes, screes, forbs Elevational range: 2500 - 3400 Flowering period: VII - VIII

Remarks: Cryptophyte; plant up to 20 cm high; stem purplish; leaf blade ovate, sparsely strigose, stipitate glandular, base rounded to broadly cuneate, margin 1–4-crenate-serrate to occasionally entire; bracts spreading pilose and glandular along veins and margin; calyx densely villous outside, stipitate glandular; corolla densely pilose outside, stipitate glandular, purple spotted on lower lip.

1182. Scutellaria orbicularis Bunge



Phytogeographical element: E, I-T

Habitat: Rocks

Elevational range: 1200 - 2500 Flowering period: V - VII

Remarks: Chamaephyte; plant 2–10 cm high; leaves densely pubescent; calyx 1.7–2.8 cm with villous and glandular tube; from the inner side glabrous.

1183. Scutellaria przewalskii Juz.



Phytogeographical element: EI-T Habitat: Steppes, screes Elevational range: 900 - 2200 Flowering period: VI fo VIII

Remarks: Cryptophyte; plant up to 22 cm high; stems purplish, sparsely fine minute tomentose; petiole flat, narrowly winged, tomentose; leaf blade ovate to elliptic, adaxially sparsely tomentose, abaxially densely gray tomentose, margin 4–7-pinnatipartite with segments fingerlike; calyx stipitate glandular hairy in fruit; nutlets

triquetrous, ovoid, densely gray tomentose.

1184. Scutellaria rubromaculata Juz. & Vved.



Phytogeographical element: E, I-T

Habitat: Rocks

Elevational range: 2000 - 2200 Flowering period: VI - VII

Remarks: Chamaephyte; dwarf plant 4–7 cm high; crown tube glabrous from the inner side; calyx 2.2–2.4 cm long.

1185. Scutellaria schugnanica B. Fedtsch.

Synonyms: *Scutellaria hissarica* B. Fedtsch. subsp. *schugnanica* (B. Fedtsch.) Popov



Phytogeographical element: E, I-T

Habitat: Rocks

Elevational range: 1300 - 3500 Flowering period: VI - IX

Remarks: Chamaephyte; plant 6–18 cm high; stem evenly densely pubescent along the entire length; calyx almost square, up to 3 mm long and about 2.5 mm wide, on fruit

up to 5.5 mm long.

1186. Scutellaria striatella Gontsch.

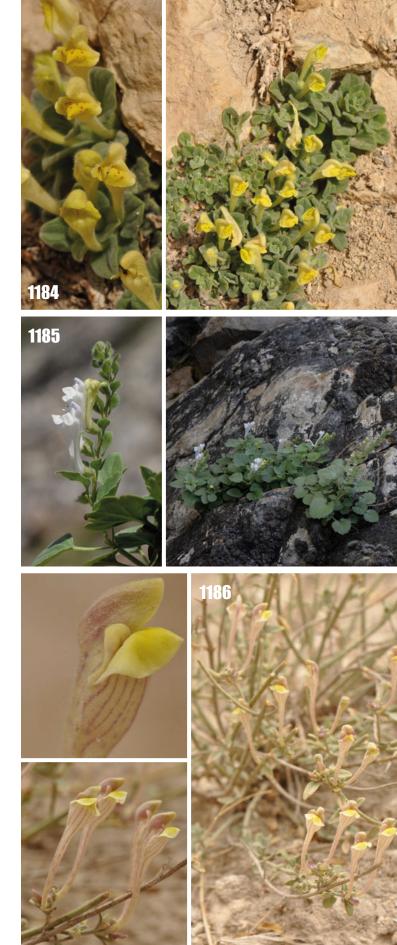


Phytogeographical element: E, I-T Habitat: Rocks, screes

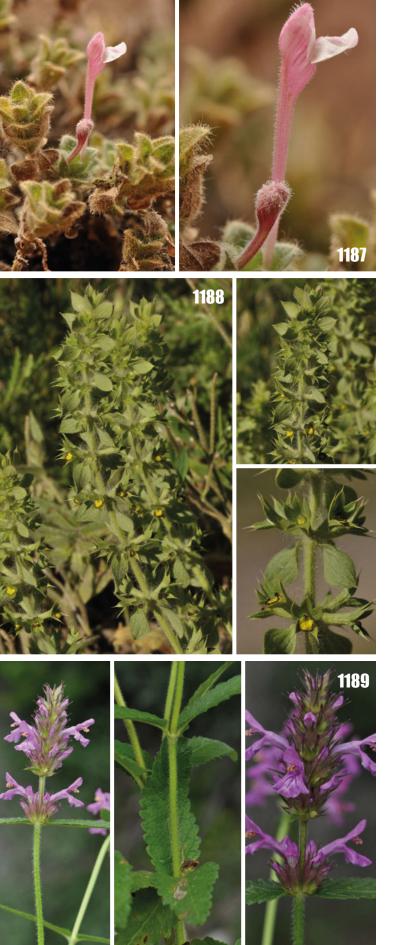
Elevational range: 900 - 2100 Flowering period: VII - VIII

Remarks: Chamaephyte; plant 30-40 cm high; calyx

curved; leaves entire.



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1187. Scutellaria zaprjagaevii Kochk. & Zhogoleva



Phytogeographical element: E, I-T

Habitat: Rocks

Elevational range: 1000 - 2900 Flowering period: V - VI

Remarks: Chamaephyte; plant 3–9 cm high, pubescent and glandular; inflorescence dense; flowers pink or violet,

3-5 cm long.

1188. Sideritis montana L.

Synonyms: Hesiodia montana (L.) Dumort.



Phytogeographical element: I-T, E-S, M

Habitat: Broad-leaved forests, screes, ruderal, steppes

Elevational range: 1300 - 2300 Flowering period: VI - VIII

Remarks: Therophyte; plant up to 20 cm high; leaf blade lanceolate to elliptic, sparsely pilose, margin entire or remotely serrulate; verticillasters 6- to many flowered; internodes of inflorescence longer than calyx; bracts

longer than flowers; calyx tube cylindric.

Usefulness: Med.

1189. Stachys betoniciflora Rupr.

Synonyms: Betonica foliosa Rupr.



Phytogeographical element: I-T

Habitat: Broad-leaved forests, meadows, xeric shrubs,

forbs

Elevational range: 1300 - 2600 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 74–110 cm high; leaves oblong, ovate or lanceolate; inflorescence cylindrical, dense, spike-shaped, sometimes lower verticillasters

distant; corolla purple-pink. Usefulness: Med, Foo.

1190. Thymus diminutus Klokov

Synonyms: Thymus aschurbajevii Klokov



Phytogeographical element: EI-T

Habitat: Rocks, loose sandy screes, alpine steppes

Elevational range: 3800 - 4400 Flowering period: VII - VIII

Remarks: Chamaephyte; plant 2–4 cm high; leaves 3–10 mm long, 1–3 mm wide, with 2 pairs lateral veins; peduncle 2–4 cm high, with 2–3 pairs of leaves.

1191. Thymus marschallianus Willd.



Phytogeographical element: EI-T, E-S

Habitat: Steppes

Elevational range: 1300 - 2200 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 2–10 cm high; leaves 4–20 mm long, 1–8.5 mm wide, with 3–4 pairs lateral veins; peduncles 2–10 cm high, with 3–5 pairs of leaves.

1192. Thymus seravschanicus Klokov

Synonyms: Thymus bucharicus Klokov, T. cuneatus Klokov



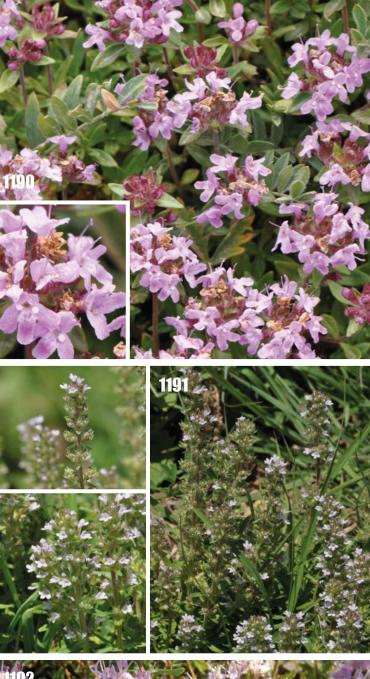
Phytogeographical element: I-T

Habitat: Rocks, loose sandy screes, screes, steppes

Elevational range: 1700 - 3600 Flowering period: VI - VIII

Remarks: Chamaephyte; plant up to 25 cm high; densely pubescent; vegetative shoots arising mostly from apical parts, shorter and less numerous than fertile branches; leaves linear-oblong 1–2.8 cm 1–6.5 mm, glabrous or sparsely puberulent, calyx tubular-campanulate 2.5–3.5 mm, glandular in fruit; corolla red-purple, pubescent,

ca. 5 mm, exserted. Usefulness: Med, Foo.





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1193. Vitex agnus-castus L.



Phytogeographical element: I-T, M, S-S Habitat: River beds, thermophilous shrubs

Elevational range: 800 - 1200 Flowering period: VI - VIII

Remarks: Nanophanerophyte; plant 1–2(–4)m high; whitish-tomentose, with obtusely quadrangular branches; leaves palmately 5–7-foliolate; cymes sessile or subsessile, forming a subcylindrical, narrow inflorescence;

flowers fragrant. Usefulness: Med, Foo, Hou, Orn.

1194. Ziziphora interrupta Juz.



Phytogeographical element: E, I-T Habitat: River beds, steppes Elevational range: 700 - 2400 Flowering period: IV - VIII

Remarks: Chamaephyte; plant 28-50 cm high;

inflorescence vertical with separated verticillasters, spike-

like; calyx villous.

1195. Ziziphora pamiroalaica Juz.

Synonyms: Ziziphora pulchella Pavlov, Z. tomentosa Juz.



Phytogeographical element: I-T

Habitat: Rocks, loose sandy screes, screes

Elevational range: 1200 - 4500 Flowering period: VI - VII

Remarks: Chamaephyte; plant 7–30 cm high; stems with short, sparse, retrorse, slightly rigid hairs; leaf blade oblong-ovate to subcircular folded, pubescent, conspicuously glandular; capitula globose; calyx with dense long hairs nearly as long as to longer than calyx width; corolla tube slightly exserted, limb large; stamens much exserted; anthers purple.

Usefulness: Med, Foo.

1196. Ziziphora tenuior L.



Phytogeographical element: I-T, M, E-S

Habitat: Screes, steppes, xeric shrubs, thermophilous

shrubs

Elevational range: 400 - 2500 Flowering period: III - VII

Remarks: Therophyte; plant 5–15(–30) cm high, aromatic (peppermint); stems with indumentum of short retrorse eglandular hairs; leaves lanceolate, linear lanceolate to linear; verticillasters mostly axillary, not crowded in a capitulum; floral leaves ciliate, much exceeding flowers; calyx narrow tubular, with short and long spreading eglandular hairs and sessile oil globules; nutlets finely granulate.

1197. Lemna minor L.



Phytogeographical element: Plurireg

Habitat: Aquatic vegetation Elevational range: 350 - 900

Remarks: Cryptophyte; aquatic plant; leaves $2-4.5 \times 2-3$ mm, flat.







1198. Utricularia minor L.



Phytogeographical element: Plurireg

Habitat: Fens and mires Elevational range: 1200 - 2300 Flowering period: VI - VII

Remarks: Cryptophyte; aquatic plant, stolons dimorphic, bearing either green leaves with narrowly linear segments with few or no traps or bearing colorless much reduced

leaves with traps.

1199. Fritillaria bucharica Regel

Synonyms: Rhinopetalum bucharicum (Regel) Losinsk.



Phytogeographical element: E, I-T Habitat: Xeric shrubs, forbs Elevational range: 900 - 2400 Flowering period: IV - V

Remarks: Cryptophyte; plant 10–40 cm high; bulb 1–2 cm in diameter; leaves oblong to lanceolate, opposite or sometimes whorled, 4–12 cm long; inflorescence 3–10-flowered; flowers campanulate, pendent; tepals white or slightly green.

Usefulness: Orn.

1200. Fritillaria eduardii A. Regel ex Regel

Synonyms: Petilium eduardii (Regel) Vved.



Phytogeographical element: I-T Habitat: Xeric shrubs, forbs Elevational range: 1200 - 2100 Flowering period: IV - V

Remarks: Cryptophyte; plant 40–80(–150) cm high; bulb 5–8 cm in diameter; leaves lanceolate, opposite or 5–15 cm long; inflorescence 4–6(–8)-flowered; flowers campanulate, pendent; tepals orange, 4-5 cm long.

Usefulness: Orn.

1201. Fritillaria olgae Vved.



Phytogeographical element: E, I-T Habitat: Xeric shrubs, forbs Elevational range: 1500 - 2900 Flowering period: V - VI

Remarks: Cryptophyte; plant 60–70 cm high; tepals yellowish-greenish from inner side; upper, unfoliated section of the stem shorter than lower part with leaves.

Usefulness: Med, Orn.

1202. Fritillaria regelii Losinsk.



Phytogeographical element: E, I-T Habitat: Xeric shrubs, forbs Elevational range: 2000 - 3000

Flowering period: VI

Remarks: Cryptophyte; plant 30-40 cm high; tepals brownish-purple from inner side; upper, unfoliated section of the stem equals lower part with leaves.

Usefulness: Orn.

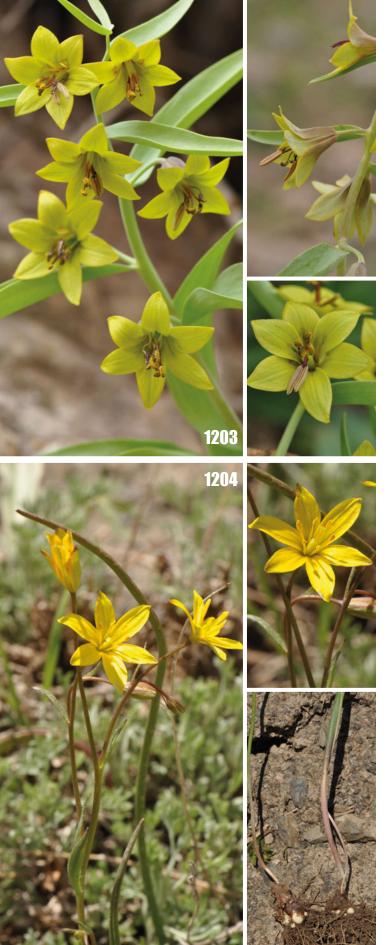












1203. Fritillaria sewerzowii Regel

Synonyms: Korolkovia severtzovii Regel



Phytogeographical element: SE, I-T

Habitat: Juniper forests, thermophilous shrubs, forbs

Elevational range: 1000 - 2200

Flowering period: IV

Remarks: Cryptophyte; plant 25–50(–70) cm high; stem rotund, glabrous; tepals not longer than 2.5–3 cm; nectaries vallecular; flowers reddish-greenish, pendulous.

Usefulness: Orn.

1204. Gagea chomutovae (Pascher) Pascher



Phytogeographical element: I-T Habitat: Meadows, steppes Elevational range: 900 - 2600 Flowering period: II - V

Remarks: Cryptophyte; plant 10–30 cm high; bulb tunic leathery; stem glabrous; smaller bulb glabrous; first leaf cylindric, 1.5–3 mm wide; tepals oblong-lanceolate

0.9-1.2(-1.8) cm long.

1205. Gagea delicatula Vved.



Phytogeographical element: E, I-T Habitat: Rocks, nitrophilous rock footings

Elevational range: 2300 - 3500 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 5–20 cm high; bulb 4–5 mm in diameter; vegetative bulbil single; tepals 6–10 mm long,

obtuse, white inside, slightly greenish outside.

1206. Gagea dschungarica Regel



Phytogeographical element: I-T

Habitat: Alpine meadows, alpine swards

Elevational range: 900 - 3400 Flowering period: III - VII

Remarks: Cryptophyte; plant 5–10(–15) cm high; bulb obliquely drop-shaped, 8–15 mm in diameter; vegetative bulbils brown, in dense group; inflorescence branched, 3–6-flowered; tepals lanceolate, tip rounded, 3–8 mm

long.

1207. Gagea gymnopoda Vved.



Phytogeographical element: E, I-T

Habitat: Fens and mires, moraines and snow-beds, springs

Elevational range: 2400 - 3500 Flowering period: VI - VII

Remarks: Cryptophyte; plant glabrous 2–6 cm high; bulbs 5–7 mm across, without bulbils at base; stem grayish white pubescent; basal leaves absent; inflorescence 3–20-flowered; tepals 5–6 mm, yellow, obtuse at apex.

















1208. Gagea olgae Regel



Phytogeographical element: I-T

Habitat: Broad-leaved forests, pastures, forbs

Elevational range: 1500 - 2900 Flowering period: II - V

Remarks: Cryptophyte; plant 3–6 cm high; bulbs without bulbils at base; stem grayish white pubescent; basal leaves 1 or 2, basal leaves slightly longer than stem; inflorescence 1–3-flowered; tepals yellow adaxially,

purplish abaxially. Usefulness: Med, For.

1209. Gagea reticulata (Pall.) Schult. & Schult. f.



Phytogeographical element: I-T Habitat: Pastures, steppes, forbs Elevational range: 400 - 2400 Flowering period: III - VI

Remarks: Cryptophyte; plant 5–12 cm high; bulbs 10-15 mm, without bulbils at base; stem white pubescent; basal leaves grayish, 1 or 2, slightly longer than stem, 1-1.5 mm across; inflorescence (1)2(–4)-flowered; tepals

yellow 9-12 mm long.

1210. Gagea vvedenskyi Grossh.



Phytogeographical element: I-T Habitat: Rocks, screes, alpine steppes Elevational range: 900 - 3600

Flowering period: V - VII

Remarks: Cryptophyte; plant up to 25 cm high; bulb drop-shaped, covered by fiber-like tunic; vegetative bulbils in the form of dense group; peduncle leaves longer than the lower inflorescences; inflorescence 1–3-flowered; tepals 8 mm long, 2–2.5 mm broad.

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Liliaceae

1211. Lloydia serotina (L.) Rchb.

Synonyms: Gagea serotina (L.) Ker Gawl.



Phytogeographical element: I-T, E-S, Arct, Montane

Habitat: Alpine meadows, alpine swards

Elevational range: 3350 - 4000 Flowering period: IV - VII

Remarks: Cryptophyte; plant up to 25 cm high; flower solitary or inflorescence 2(–4) flowered raceme; tepals less than 1.8 cm long, glabrous, white with pinkish-red or purple veins, nectary near the base; filaments glabrous; style as long as or slightly longer than ovary.

1212. Tulipa bifloriformis Vved.



Phytogeographical element: E, I-T

Habitat: Juniper forests, alpine swards, alpine steppes

Elevational range: 850 - 2700 Flowering period: III - IV

Remarks: Cryptophyte; plant 10–25 cm high; tunic lined inside with long, undulate hairs; stamen filaments

pubescent.

Usefulness: Med, Orn.

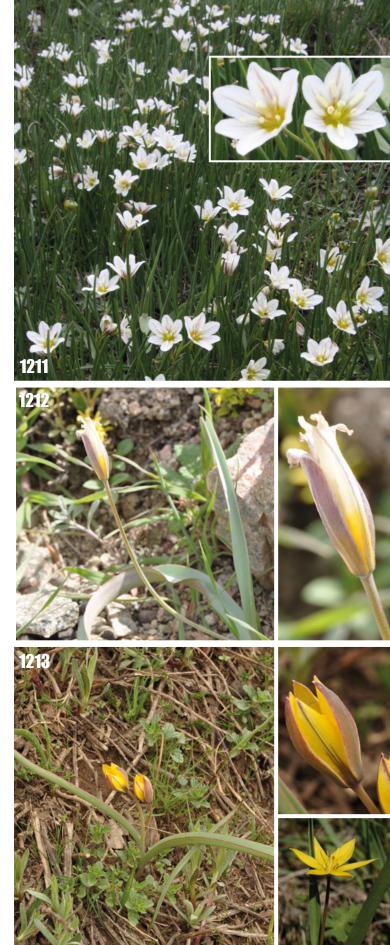
1213. Tulipa dasystemon (Regel) Regel

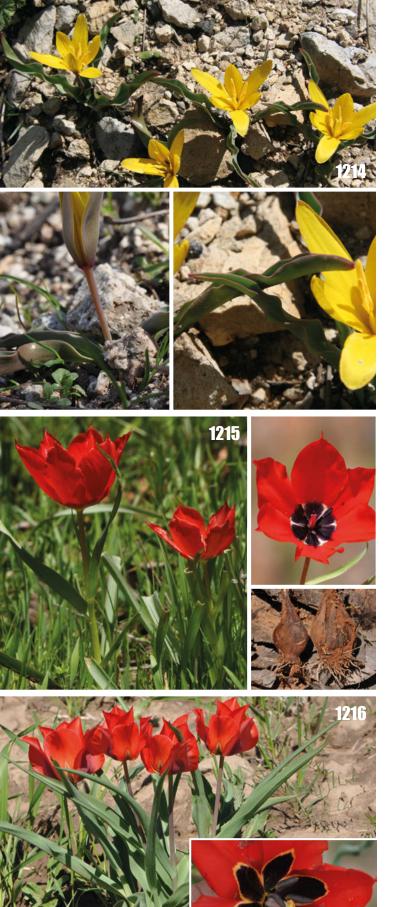


Phytogeographical element: I-T Habitat: Juniper forests Elevational range: 2400 - 3600 Flowering period: V - VI

Remarks: Cryptophyte; plant 10–20 cm high; bulb ovoid, tunic papery; stamen filaments pubescent; capsule oblong.

Usefulness: Orn.





1214. Tulipa hissarica Popov & Vved.



Phytogeographical element: E, I-T Habitat: Meadows, steppes Elevational range: 1300 - 3500 Flowering period: V - VII

Remarks: Cryptophyte; plant 4–12 cm high; leaves (2–3)–4–5; tepals 1.5–2(–3) cm long, yellow, glabrous; stamen

filaments glabrous, yellow.

Usefulness: Orn.

1215. Tulipa linifolia Regel



Phytogeographical element: E, I-T

Habitat: Xeric shrubs, thermophilous shrubs

Elevational range: 1300 - 1800 Flowering period: IV - VI

Remarks: Cryptophyte; plant 10–25 cm high; bulb 1–2 cm across; leaves (6–8) linear, glabrous; tepals red with dark violet patch at the base with pale yellow lining, 2-4 cm

long; stamen filaments glabrous.

Usefulness: Orn.

1216. Tulipa maximowiczii Regel



Phytogeographical element: E, I-T

Habitat: Steppes

Elevational range: 650 - 1500 Flowering period: IV - VI

Remarks: Cryptophyte; plant 15–30 cm high; bulb 1–3 cm across; leaves (5–8) lanceolate, ciliate at margins; tepals red with deep blue-blackish patch at the base with pale yellow lining, 2.5–4 cm long; stamen filaments glabrous.

Úsefulness: Orn.

1217. Tulipa praestans H.B. May



Phytogeographical element: E, I-T

Habitat: Juniper forests, xeric shrubs, forbs

Elevational range: 1000 - 2000 Flowering period: IV - VI

Remarks: Cryptophyte; plant 15-40(-70) cm high; bulb 2-4 cm across; leaves (3-5) lanceolate, pubescent, ciliate at margins; tepals orange-red, 3.5-7 cm long; stamen

filaments glabrous. Usefulness: Orn.

1218. Tulipa tubergeniana Hoog



Phytogeographical element: E, I-T Habitat: Thermophilous shrubs Elevational range: 1600 - 1800

Flowering period: IV - V

Remarks: Cryptophyte; plant 15-30 cm high; bulb 2-3 cm across; leaves (3) lanceolate; tepals red with black, yellow lined patch at the base, 2.5–10 cm long; stamen filaments

glabrous. Usefulness: Orn.

1219. Tulipa turkestanica (Regel) Regel

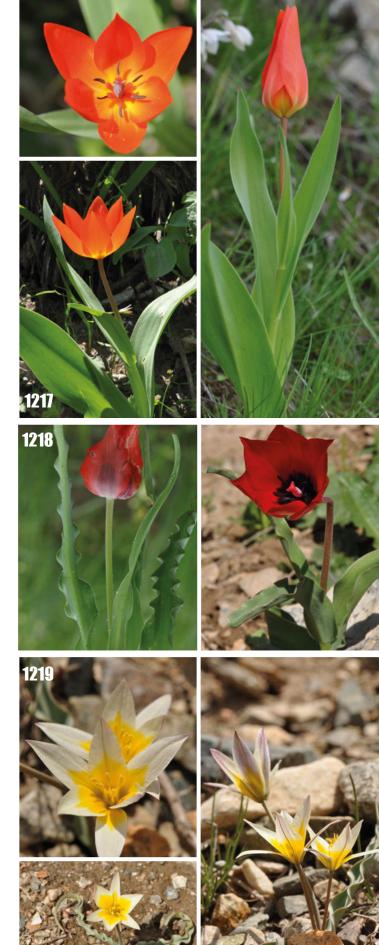


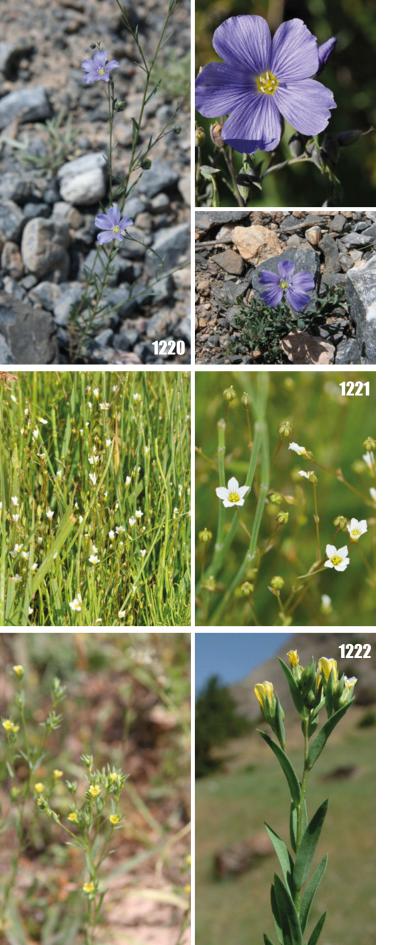
Phytogeographical element: SE, I-T Habitat: Alpine swards, alpine steppes

Elevational range: 800 - 3000 Flowering period: III - IV

Remarks: Cryptophyte; plant 10-25 cm high; stamen filaments pubescent, tunic lined inside with short hairs.

Usefulness: Orn.





1220. Linum altaicum Ledeb. ex Juz. subsp. atricalyx (Juz.) Svetlova

Synonyms: Linum atricalyx Juz.



Phytogeographical element: SE, I-T

Habitat: Alpine steppes Elevational range: 3200 - 3900 Flowering period: VI - VII

Remarks: Cryptophyte; plant 10–45 cm high; flowers ca. 3 cm in diameter, in cymes with 3–8 flowers; sepals ovate, ca. 3.5–4 mm long, blackish green; petals deep blue,

obovate.

1221. Linum catharticum L.



Phytogeographical element: Plurireg

Habitat: Fens and mires Elevational range: 1550 - 1850 Flowering period: V - VI

Remarks: Therophyte; plant up to 30 cm high, annual; stems delicate with flowers in a very loose, remote arrangement; leaves narrow, in opposite pairs, 1-veined; flowers 4–6 mm in diameter, white with yellow centre,

5 unnotched petals and 5 stamens.

1222. Linum corymbulosum Rchb.



Phytogeographical element: I-T, M, E-S

Habitat: River beds, riverside forests, steppes, thermophilous shrubs

Elevational range: 500 - 2500 Flowering period: V - VI

Remarks: Therophyte; plant 10–30 cm high; stems corymbosely branched apically; flowers axillary or opposite a leaf, solitary or in broad cymes; petals yellow,

long obovate, $6-8 \times \text{ca. 2 mm.}$

500 Linaceae

1223. Linum macrorhizum Juz.

Synonyms: Linum mesostylum Juz.



Phytogeographical element: E, I-T Habitat: Steppes, xeric shrubs, forbs Elevational range: 1900 - 3900 Flowering period: VI - VII

Remarks: Cryptophyte; plant 10–30 cm high; leaves with one vein; flowers ca. 2.5 cm in diameter, solitary or in cymes with up to 5 flowers; sepals ovate, ca. 3.5–4 mm long with 5 veins; petals deep blue, obovate.

1224. Linum olgae Juz.



Phytogeographical element: I-T

Habitat: Alpine meadows, xeric shrubs, forbs

Elevational range: 2000 - 3200 Flowering period: VI - VII

Remarks: Cryptophyte; plant 25–50 cm high; sepals lanceolate, ca. 0.7×1.2 cm, reddish glandular ciliate at margins; petals rose to purple, obovate, 3–4 cm long.

1225. Linum pallescens Bunge



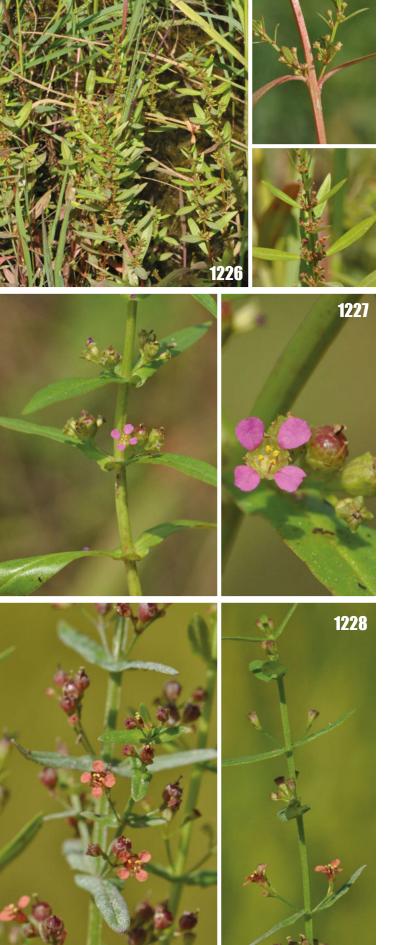
Phytogeographical element: I-T, E-S Habitat: Alpine steppes Elevational range: 3600 - 3900

Flowering period: VI - VII

Remarks: Cryptophyte; plant 10–30 cm high; flowers solitary or in cymes, ca. 2 cm in diameter; sepals ovate, ca. 3.5×2 mm; petals white to blue, obovate, ca. $2 \times$ as long

as sepals.





1226. Ammannia auriculata Willd.



Phytogeographical element: I-T, I-I, M, Austral, Americ

Habitat: Fields

Elevational range: 400 - 1000 Flowering period: VIII

Remarks: Therophyte; plant (15–)30–60 cm high; calyx 1.5–2.5 mm long; petals 1.5–2 mm long; capsule 3 mm in

liameter.

1227. Ammannia baccifera L.



Phytogeographical element: I-T, I-I, M, Austral, Americ

Habitat: Fields

Elevational range: 700 - 1000 Flowering period: VIII - IX

Remarks: Therophyte; plant 20–70 cm high; leaves basally attenuate to truncate; petals absent; style shorter than

ovary.

1228. Ammannia multiflora Roxb.



Phytogeographical element: I-T, I-I, Austral, Afryk

Habitat: Fields

Elevational range: 400 - 1000 Flowering period: VIII - IX

Remarks: Therophyte; plant 5–35 cm high; calyx 1–1.2 mm

long; petals 0.5-0.8 mm long; capsule 1-1.3 mm in

diameter.

1229. Punica granatum L.



Phytogeographical element: I-T

Habitat: Orchards and gardens, thermophilous shrubs

Elevational range: 600 - 1800 Flowering period: IV - VI

Remarks: Megaphanerophyte; plant 2–3 m high; branches and branchlets 4-angled; leaf blade adaxially shiny, lanceolate, elliptic-oblanceolate, or oblong, $2-9\times1-2$ cm, petiole 2–10 mm; floral tube red-orange or pale yellow, campanulate-urceolate; petals 5–9, bright red-orange; stamens numerous; fruit globose, leathery berries.

Usefulness: Foo.

1230. Rotala indica (Willd.) Koehne



Phytogeographical element: I-T, I-I

Habitat: Fields

Elevational range: 700 - 800 Flowering period: VIII - IX

Remarks: Therophyte; plant (5–) 10–25 cm high; leaves obovate, spatulate or elliptic, 7–18 mm long, (2–)4–9 mm wide; calyx 2.5–3 mm long, without appendages; petals 4,

pink, minute to ca. 1/2 as long as sepals.

1231. Abutilon theophrasti Medik.



Phytogeographical element: Plurireg

Habitat: Orchards and gardens, ruderal, fields

Elevational range: 350 - 1200 Flowering period: VI - VII

Remarks: Therophyte; plant 1–2 m high; epicalyx absent;

fruit consisting of many achenes.

Usefulness: Ind.

























1232. Alcea baldshuanica (Bornm.) Iljin



Phytogeographical element: I-T

Habitat: Orchards and gardens, fields, steppes

Elevational range: 600 - 2400 Flowering period: V - IX

Remarks: Cryptophyte; plant 30–120 cm high; densely stellate hirsute; epicalyx cup-shaped, lobes linear to

anceolate.

1233. Alcea nudiflora (Lindl.) Boiss.



Phytogeographical element: I-T Habitat: Screes, steppes Elevational range: 800 - 2900 Flowering period: V - IX

Remarks: Cryptophyte; plant up to 80 cm high; leaves on proximal part of stem deeply lobed, central lobe longer

than wide; corolla white. Usefulness: Foo, Orn.

1234. Alcea rosea L.



Phytogeographical element: A, I-T Habitat: Orchards and gardens, ruderal

Elevational range: 550 - 1500 Flowering period: V - VIII

Remarks: Cryptophyte; plant up to 2(–3) m high; leaves on proximal part of stem shallowly lobed, central lobe wider than long; corolla often colored, infrequently white.

Usefulness: Orn.

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Malvaceae

1235. Althaea cannabina L.



Phytogeographical element: I-T, M Habitat: River beds, fields Elevational range: 800 - 3000 Flowering period: VI - VII

Remarks: Cryptophyte; leaves 3-12 cm long and broad,

5-parted; fruit 6-8 mm across, glabrous.

Usefulness: Foo, Ind.

1236. Althaea officinalis L.



Phytogeographical element: A, Plurireg

Habitat: Ruderal, steppes Elevational range: 400 - 1000 Flowering period: VI - VIII

Remarks: Cryptophyte; plant erect, ca. 1 m tall; stem densely stellate hirsute; leaf blade ovate-orbicular or cordate, 3-lobed or not lobed; corolla pink, ca. 2.5 cm in diameter; petals ca. 1.5 cm, fruit a disk-shaped schizocarp, ca. 8 mm in diameter.

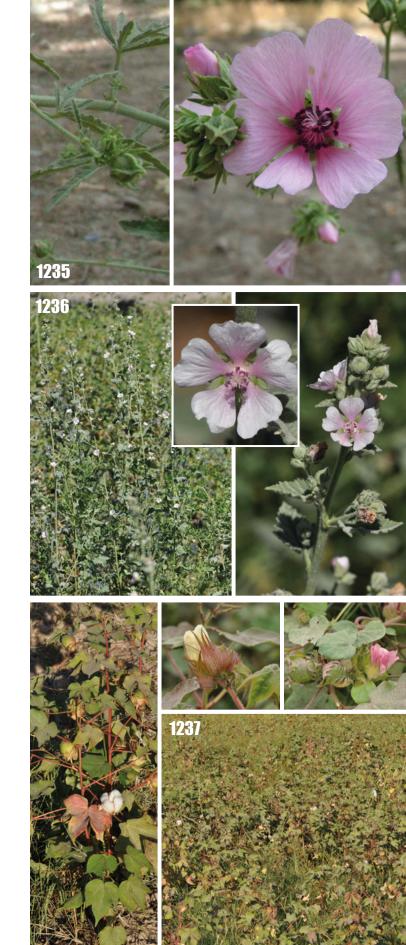
1237. Gossypium hirsutum L.



Phytogeographical element: Cultivated

Habitat: Cultivated in fields Elevational range: 400 - 900 Flowering period: VII - X

Remarks: Therophyte; plant 50-120 cm high; stem covered exclusively by long hairs; leaves 3-10 cm long, broader than long, somewhat orbicular, 3(-5)-lobed, capsule 3-4 cm long 2-3 cm broad, ovoid, beaked, coarsely pitted, 3-5 celled.



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1238. Hibiscus trionum L.



Phytogeographical element: I-T, M, I-I

Habitat: Fields

Elevational range: 350 - 1600 Flowering period: VI - XI

Remarks: Therophyte; plant 5–60 cm high; leaves dissected; petals pale yellow with purple center.

1239. Malva bucharica Iljin



Phytogeographical element: I-T Habitat: Ruderal, steppes Elevational range: 800 - 1400 Flowering period: V - VIII

Remarks: Therophyte, hemicryptophyte; plant 20–60 cm high; epicalyx bracts ovate; tube pubescent with simple

hairs; corolla $2-3 \times longer$ than calyx.

1240. Malva neglecta Wallr.



Phytogeographical element: Plurireg

Habitat: Ruderal

Elevational range: 350 - 4000 Flowering period: VI - X

Remarks: Cryptophyte, hemicryptophyte; plant 5–45 cm high; epicalyx with 3 linnear bracts; corolla pink, 2–3 × longer than calyx; fruit with (12–)14(–16) dansely

pubescent seeds.

Usefulness: Med, For, Foo.

1241. Ficus carica L.



Phytogeographical element: I-T

Habitat: Broad-leaved forests, thermophilous shrubs, forbs

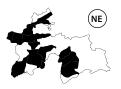
Elevational range: 600 - 1900 Flowering period: IV - V

Remarks: Megaphanerophyte; tree, 4–10 m high; leaves

10–15 (–25) cm with 5 lobes.

Usefulness: Foo.

1242. Morus alba L.



Phytogeographical element: Plurireg

Habitat: Shrubs, cultivated Elevational range: 600 - 2000 Flowering period: V - VI

Remarks: Megaphanerophyte; tree 15–20 m high; leaves soft, glabrous or somewhat scabrous; syncarps purple or

white, cylindric, $1.5-2.5 \times 1$ cm.

1243. Morus nigra L.



Phytogeographical element: Plurireg

Habitat: Shrubs, cultivated Elevational range: 600 - 2000 Flowering period: V - VI

Remarks: Megaphanerophyte; tree 15–20 m high; leaves somewhat scabrous; syncarps black or dark purple,

cylindric, $2-2.5 \times 1$ cm.













1244. Nitraria sibirica Pall.



Phytogeographical element: EI-T, E-S

Habitat: Alpine semi-deserts, river-beds, screes

Elevational range: 1400 - 1900 Flowering period: V - VI

Remarks: Nanophanerophyte; shrub 0.5–1.5 m tall with young branches white; leaves in fascicles of 4–6 on current year branchlets, oblanceolate, 6–15 × 2–5 mm; cymes 1–3 cm, pubescent; sepals 5, green, petals oblong, 2–3 mm; fruit dark red, ellipsoid to spherical, 6–8 mm in diameter.

1245. Peganum harmala L.



Phytogeographical element: I-T, M, E-S Habitat: Semi-deserts, steppes Elevational range: 450 - 3700

Flowering period: V - VIII

Remarks: Cryptophyte; plant 30–70 cm high, erect or spreading, glabrous; leaf blade divided into 3–5 lobes, lobes 1.5–3 mm wide; sepals 5, divided into linear lobes, 1.5–2 cm long; petals 5, yellowish-white, obovate-oblong, $15-20 \times 6-9$ mm.

1246. Tetradiclis tenella (Ehrenb.) Litv.



Phytogeographical element: I-T, E-S Habitat: Salt shrubs, salt marshes Elevational range: 400 - 500 Flowering period: IV - V

Remarks: Therophyte; plant 10–20 cm high; stem verticillately branched; leaves fleshy, up to 10 mm long, ca. 2–3 mm broad, obtuse; sepals triangular, slightly shorter than petals, petals wedge-shaped, ca. 1 mm long; capsule subglobose, 3–4 mm in diameter, inflated and cross split at the apex, 4-valved.

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Nitrariaceae

1247. Fraxinus raibocarpa Regel



Phytogeographical element: I-T Habitat: Thermophilous shrubs Elevational range: 1000 - 2000 Flowering period: IV - V

Remarks: Nanophanerophyte; plant 3-4(-6) m high; leaves 10(-15) cm long, with 1-2(-3) pairs of leaflets; corolla present; inflorescence terminal or in axils or current year's leaves.

Usefulness: Orn.

1248. Fraxinus sogdiana Bunge



Phytogeographical element: I-T

Habitat: Broad-leaved forests, riverside forests

Elevational range: 1000 - 2000 Flowering period: III - IV

Remarks: Megaphanerophyte; plant up to 20(-28) m high; leaves 15(-24) cm long, with 3-5(-6) pairs of leaflets with lower margin entire and upper serrate; corolla absent; inflorescence in axils of preceeding year's leave.

Usefulness: Orn.

1249. Chamaenerion angustifolium (L.) Scop.

Synonyms: Epilobium angustifolium L.



Phytogeographical element: Plurireg

Habitat: River beds, fens and mires, littoral vegetation,

springs

Elevational range: 1250 - 4000 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 30–250 cm high, erect; leaves spirally arranged; flowers showy, zygomorphic; the style deflexed, at least before the anthers have dehisced; flora tube absent; inflorescence spicate, many flowered; seeds smooth, 1-1.3 mm long.

















1250. Chamaenerion latifolium (L.) Th. Fries & Lange

Synonyms: Epilobium latifolium L.



Phytogeographical element: EI-T, E-S, Arctic Habitat: River beds, moraines and snow-beds

Elevational range: 2300 - 4200 Flowering period: VI - VII

Remarks: Cryptophyte; plant 12–35 cm tall, leaves sessile or petioles to 2 mm, 2–5(–8) 0.6–1.7(–2.6) cm, subglabrous or strigillose; sepals 1–1.6 cm 1.5–3.5 mm; petals rose–purple or pink, 1–2.4(–3.2) cm \times 7–15(–23) mm; capsules 2.5–8 cm.

1251. Epilobium hirsutum L.

Synonyms: Epilobium velutinum Nevski



Phytogeographical element: I-T Habitat: River beds, littoral vegetation Elevational range: 1000 - 2000 Flowering period: VI - IX

Remarks: Cryptophyte; plant 40–100(–180) cm high, with long spreading and short erect glandular hairs; leaves clasping; corolla 12–20 mm long; stigma deeply 4-lobed.

1252. Epilobium minutiflorum Hausskn.



Phytogeographical element: I-T

Habitat: River beds, fens and mires, littoral vegetation,

springs

Elevational range: 1100 - 2400 Flowering period: V - VIII

Remarks: Cryptophyte; plant 10–40 cm high; leaves 2–6 cm long and 6–15 mm wide; flowers 3–5 mm long,

pink, stigma capitate.

512 Onagraceae

1253. Epilobium palustre L.



Phytogeographical element: Plurireg

Habitat: Alpine meadows, fens and mires, littoral

vegetation, springs

Elevational range: 2300 - 3000 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 15–40 cm high; leaves sublinear to narrowly lanceolate, subentire to obscurely denticulate; capsules 3–9 cm; seeds 1.3–2.2 mm.

Usefulness: For.

1254. Epilobium tianschanicum Pavlov



Phytogeographical element: I-T

Habitat: River beds, fens and mires, littoral vegetation,

springs

Elevational range: 1100 - 3300 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 20–80 cm high; stem pubescent in the upper and glabrous in the lower part; leaves serrate, cuneate with petioles; calyx 4–5 mm; petals 5–7 mm; stigma capitate; stem in middle section glabrous.

1255. Ludwigia peploides (Kunth) P.H. Raven subsp. stipulacea (Ohwi) P.H. Raven



Phytogeographical element: A, Plurireg Habitat: Rivers, aquatic vegetation Elevational range: 750 - 800 Flowering period: VIII - IX

Remarks: Cryptophyte; plant 10–60 cm, branched; leaf blade oblong, 2.5– 10×1 –3.2 cm; sepals 5, deltoid-acuminate, 6–12 mm, glabrous or villous; petals bright golden-yellow with a darker spot at base, obovate, 9– 17×10^{-10}

5–11 mm.

















1256. Botrychium lunaria (L.) Sw.



Phytogeographical element: Plurireg Habitat: Juniper forests, alpine swards Elevational range: 2000 - 2550 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 3–15 cm; frond primordium glabrous; sterile lamina pinnate; sporophore with stalk 4–7 cm, glabrous; panicle 2- or 3-pinnate, racemose, 3–6 × 1.5–2 cm, glabrous; sporangia sessile, large, 0.5–1 mm

in diameter. Usefulness: Med.

1257. Ophioglossum bucharicum O. Fedtsch. & B. Fedtsch.



Phytogeographical element: SE, I-T Habitat: Riverside forests Elevational range: 500 - 1000 Flowering period: V - VI

Remarks: Cryptophyte; plant perennial, 5–20 cm high; spike starts in lower part of the leaf blade; spore whitish;

almost smooth.

1258. Cephalanthera longifolia (L.) Fritsch



Phytogeographical element: Plurireg Habitat: Broad-leaved forests Elevational range: 1500 - 2200 Flowering period: V -VI

Remarks: Hemicryptophyte; plant up to 50 cm high; leaves elliptic, lanceolate $4-16 \times 0.5-3$ cm, apex acuminate; inflorescence 2–20-flowered; flowers 1–1.5 cm; petals subobovate, 7×4 mm, 5–7-veined; anthers 2–2.5 mm;

stigma stalked.

1259. Coeloglossum viride (L.) C. Hartm.



Phytogeographical element: Plurireg

Habitat: Meadows

Elevational range: 1500 - 2500 Flowering period: V - VII

Remarks: Cryptophyte; plant 7-25 (-40) cm high; stem

leaves 3-4(-5), narrowed towards the long sheathing base, $7 \times 2(-3)$ cm, the lower elliptic-oblong, obtuse, the upper oblong-lanceolate, acute. Inflorescence rather dense, short, 3-6(-13) cm long; perianth segments

forming a semiglobular hood.

1260. Dactylorhiza umbrosa (Kar. & Kir.) Nevski



Phytogeographical element: I-T, E-S Habitat: Riverside forests, fens and mires

Elevational range: 600 - 3000 Flowering period: V - VII

Remarks: Cryptophyte; plant 20–50 cm high; inflorescence

dense; flowers purple to light purple.

1261. Epipactis helleborine (L.) Crantz



Phytogeographical element: I-T, M, E-S

Habitat: Riverside forests Elevational range: 1200 - 3300 Flowering period: VI - VIII

Remarks: Cryptophyte; plant perennial, 30–90 cm high; inflorescence dense; perianth leaves green, usually obtuse.

Usefulness: Med.

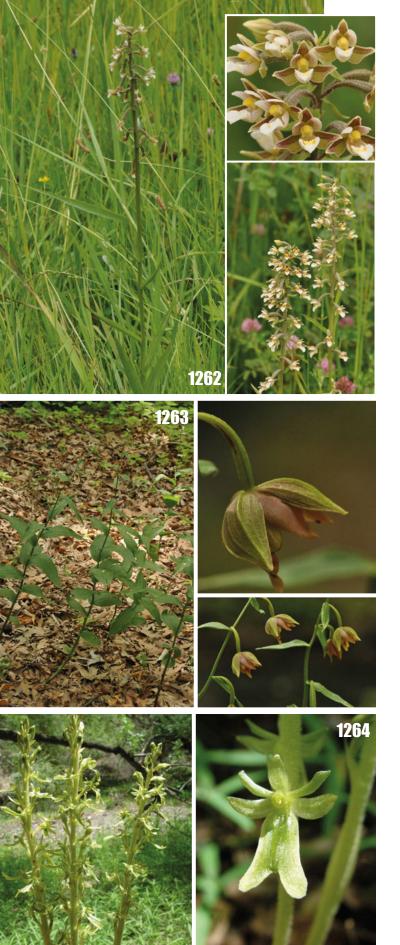












1262. Epipactis palustris (L.) Crantz



Phytogeographical element: I-T, E-S, M

Habitat: River beds, riverside forests, fens and mires

Elevational range: 1100 - 1900 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 25–60 cm high; leaves 7 or 8; ovary, rachis and stem pubescent; epichile of lip oblate to suborbicular, connected to hypochile by a short mesochile

ca. 2 mm.

1263. Epipactis royleana Lindl.



Phytogeographical element: I-T

Habitat: Broad-leaved forests, riverside forests

Elevational range: 1100 - 2500 Flowering period: V - VIII

Remarks: Cryptophyte; plant 30–80 cm high; leaves 6–9, glabrous; lip purple or pink with purple or dark red venation; rachis 2–8-flowered; perianths 1.5–2 cm.

1264. Neottia camtschatea (L.) Rchb. f.



Phytogeographical element: I-T, E-S

Habitat: Riverside forests Elevational range: 2100 - 3100 Flowering period: VI - VII

Remarks: Cryptophyte; plant 15–35 high, parasitic, glandular in the upper part of the stem; inflorescence

many-flowered, 5-15 cm.

516 Orchidaceae

1265. Neottia ovata (L.) Bluff & Fingerh.

Synonyms: Listera ovata (L.) R. Br.



Phytogeographical element: Plurireg

Habitat: Riverside forests Elevational range: 1300 - 1600 Flowering period: V - VI

Remarks: Cryptophyte; plant 15–40(–70) high; leaves two, broad, subopposite in about the middle of the stem, sessile, parallel-nerved; inflorescence loosely many-

flowered, up to 25 cm, rachis pubescent.

1266. Cistanche mongolica Beck



Phytogeographical element: I-T

Habitat: Riverside forests, semi-deserts, salt shrubs

Elevational range: 350 - 600 Flowering period: V - VII

Remarks: Cryptophyte; plant 60–100 cm high; stems unbranched; inflorescences spicate, 12–18 cm, 5–6 cm in diameter; corolla rose- or violet-white, tubular-funnelform, 3.5–4.5 cm, glabrous at base; lobes 5, subrounded, subequal, ca. 8×10 mm, glabrous.

Usefulness: Foo.

1267. Cistanche salsa (C.A. Mey.) Beck



Phytogeographical element: I-T, E-S

Habitat: Riverside forests, semi-deserts, salt shrubs

Elevational range: 350 - 1650 Flowering period: IV - VI

Remarks: Cryptophyte; plant 15-40 cm high;

inflorescences 8–20 cm; bract ovate or oblong-lanceolate, 1–1.5(–2) cm, margin densely yellow-white villous, sparsely pubescent abaxially; corolla tubular-campanulate, 2.5.4 cm; tubo white or yellow white labor 5, pole purple

2.5–4 cm; tube white or yellow-white; lobes 5, pale purple or purple, subrounded, $5-7 \times 5-7$ mm; filament base

densely white villous. Usefulness: Foo.

Orchidaceae – Orobanchaceae





















1268. Euphrasia fedtschenkoana Wettst. ex Juz.



Phytogeographical element: E, I-T Habitat: Fens and mires Elevational range: 3200 - 3800 Flowering period: VII - IX

Remarks: Therophyte; plants 2–20 cm high; pubescent throughout with simple and glandular hairs; peduncles

1–2 mm long.

1269. Euphrasia pectinata Ten.



Phytogeographical element: I-T, M, E-S Habitat: Fens and mires, steppes, forbs Elevational range: 1000 - 3200

Flowering period: VI - IX

Remarks: Therophyte; plants 2–30 cm high; pubescent throughout with eglandular hairs; upper leaves acute,

shortly awned.

1270. Leptorhabdos parviflora (Benth.) Benth.



Phytogeographical element: I-T

Habitat: Broad-leaved forests, riverside forests, screes,

steppes, xeric shrubs, forbs Elevational range: 350 - 3400 Flowering period: VI - IX

Remarks: Therophyte; plant 10–100 cm high; calyx 3–7 mm, cover with glandular hairs; corolla 4–8 mm,

pinkish.

1271. Odontites vulgaris Moench



Phytogeographical element: I-T, Orient, E-S Habitat: Riverside forests, fields, steppes

Elevational range: 400 - 2100 Flowering period: VI - X

Remarks: Therophyte; plant 3–80 cm high; leaves 1.5–4.5 cm lond and 2–5 mm wide; calyx 4–5 mm, corolla

7–8.5 mm long, softly hairy.

1272. Orobanche amoena C.A. Mey.



Phytogeographical element: I-T, E-S

Habitat: Steppes

Elevational range: 350 - 3100 Flowering period: IV - VII

Remarks: Cryptophyte; plant 15–40 cm high; inflorescence lax; corolla violet; stigma white; host species: *Artemisia*

spp.

1273. Orobanche camptolepis Boiss. & Reut.

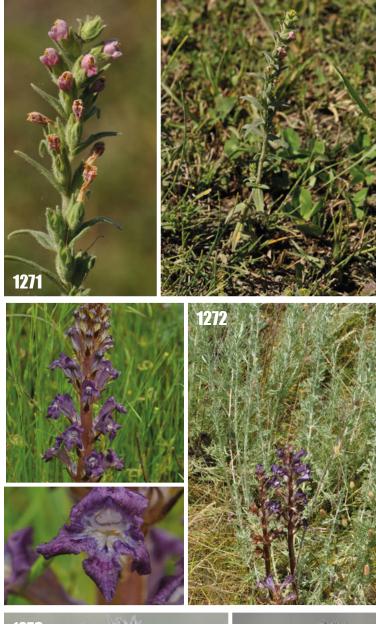


Phytogeographical element: I-T, M, S-S Habitat: River beds, screes, steppes, forbs

Elevational range: 2500 - 3400 Flowering period: VI - VIII

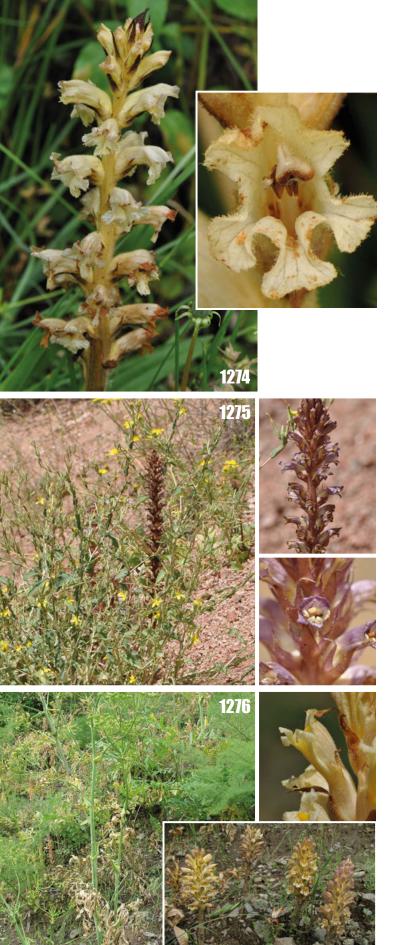
Remarks: Cryptophyte; plant 6–20 cm long; corolla 1–1.6 cm long, almost straight; host species: *Polygonum*

spp., Ziziphora spp, Artemisia spp.









1274. Orobanche caryophyllacea Sm.



Phytogeographical element: I-T, E-S

Habitat: Screes, steppes Elevational range: 1500 - 1800 Flowering period: VI - VII

Remarks: Cryptophyte; plant 20–50 cm high; inflorescence usually lax and few flowered; corolla pinkish, light-brownish or yellow; lower lip of corolla glandularciliate; stigma red, rarely yellow; host species: *Galium* spp. and

Asperula spp.

1275. Orobanche grenieri F.W. Schultz



Phytogeographical element: M, I-T

Habitat: Screes, steppes Elevational range: 1500 - 1900 Flowering period: VII - VII

Remarks: Cryptophyte; plant 16–38(52); inflorescence shorter than remaining stem; corolla 17–18 mm; calyx 7–11 mm, corolla dorsal lines are regularly curved, lower lip with large and broad lobes, bluish–violet, host

species: Lactuca spp.

1276. Orobanche kotschyi Reut.



Phytogeographical element: I-T Habitat: Screes, steppes, forbs Elevational range: 1700 - 3000 Flowering period: VI - VII

Remarks: Cryptophyte; plant 20–65 cm high; corolla yellowish, 1.6–2.5 cm; host species: *Ferula* spp., *Prangos*

spp

1277. Orobanche solenanthi Novopokr. & Pissjauk.



Phytogeographical element: E, I-T Habitat: Steppes, forbs Elevational range: 1800 - 1900 Flowering period: VI - VII

Remarks: Cryptophyte; plant 15–500 cm high; corolla 2–3 cm long, almost straight, host species: *Solenanthus*

spp., Lindelophia spp.

1278. Parentucellia flaviflora (Boiss.) Nevski



Phytogeographical element: I-T

Habitat: Steppes, thermophilous shrubs, forbs

Elevational range: 300 - 2400 Flowering period: IV - V

Remarks: Therophyte; plant annual, 4–35 cm high; plant densely villous and glandular, calyx 7–12 mm; corolla

1–1.4 mm, yellow.

1279. Pedicularis amoeniflora Vved.



Phytogeographical element: E, I-T

Habitat: Screes, alpine steppes, moraines and snow-beds

Elevational range: 2300 - 4200 Flowering period: V - VIII

Remarks: Cryptophyte; plant 5–15 cm high; stem glabrous, but below inflorescence villous; no basal leaves; cauline leaves opposite or in whorls, laceloate, with entire margin; inflorescensce with many flowers, dense; corolla pink, 2–2.4 cm long, bent at the right angle; helmet (galea) with one small tooth.

Orobanchaceae



















1280. Pedicularis cheilanthifolia Schrenk



Phytogeographical element: I-T Habitat: Fens and mires Elevational range: 3500 - 4700 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 5–15 cm high; basal leaves present, with petioles; upper side of leaf glabrous, underside scarcely, shortely pubecent; cauline leaves opposite or in whorls; leaf blade margin revolute; corolla pink or white; helmet (galea) falcate, apex with short, conical beak or beakless.

1281. Pedicularis dolichorrhiza Schrenk



Phytogeographical element: I-T

Habitat: Riverside forests, fens and mires, forbs

Elevational range: 1800 - 4000 Flowering period: VI - VII

Remarks: Cryptophyte; plant stem 10-85 cm high; calyx

8–12 mm long with equal teeth.

1282. Pedicularis grigorjevii Ivanina



Phytogeographical element: E, I-T

Habitat: Alpine steppes Elevational range: 3000 - 3300 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 4–8 cm high; stem densely hirsute, in the inflorescence tomentosus; no basal leaves; cauline leaves on short petioles, lanceolate, pinnately divided with sharply incised segments; leaves opposite or in whorls; inflorescense of capitate shape; corolla pale or intense yellow; helmet (galea) nearly stright, beakless; filaments of two stamens filiform; calyx 6–9 mm long, with unequal teeth.

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1283. Pedicularis inconspicua Vved.



Phytogeographical element: I-T Habitat: Alpine meadows Elevational range: 1650 - 3350 Flowering period: VI - VIII

Remarks: Cryptophyte; plant with stem 1–5 cm high; basal leaves lacking, cauline leaves opposite or in whorls, almost glabrous; inflorescence dense, ovoid, flowers in dense whorls; calyx campanulate 10–13 mm, glabrous or sparsely villous; corolla 24–28 mm long, tube decurved, upper lip apparently 2-dentate; capsule ovate.

1284. Pedicularis korolkowii Regel



Phytogeographical element: M, I-T, E-S

Habitat: Alpine meadows Elevational range: 1800 - 3400 Flowering period: VI - VII

Remarks: Cryptophyte; plant up to 20 cm high; basal leaves petiolate $2-6 \times 1-2$ cm, pinnatisect with lanceolate blade; stem leaves in two whorls, sessile; inflorescence dense, flowers in dense whorls, lower distant; calyx campanulate 6-8 mm, membranous; corolla 15-23 mm, tube decurved, lower lip widely trilobate; capsule ovate.

1285. Pedicularis krylovii Bonati



Phytogeographical element: E, I-T

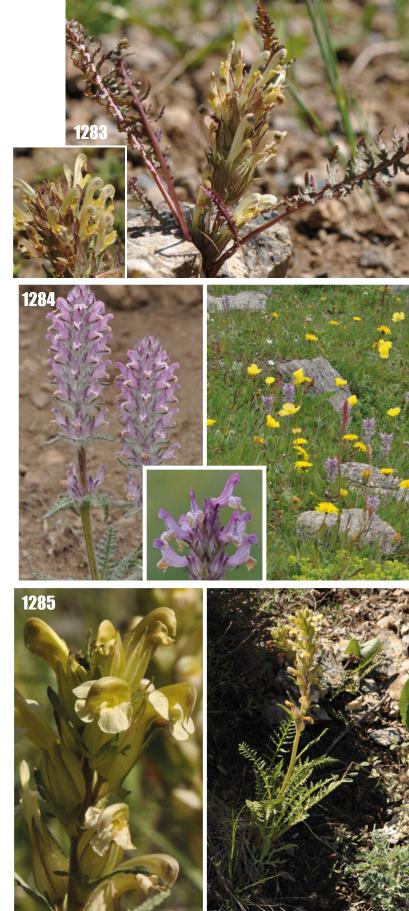
Habitat: Riverside forests, fens and mires, forbs

Elevational range: 2100 - 4000

Flowering period: VI

Remarks: Cryptophyte; plant stem 18-25 cm high; calyx

1.4-1.5 cm long with unequal teeth.

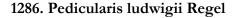














Phytogeographical element: EI-T

Habitat: River beds, riverside forests, fens and mires

Elevational range: 3200 - 4300 Flowering period: VII - VIII

Remarks: hemicryptophyte; plant 5–20(–40) cm; root rod-like, slender; stems single or 3–6 cespitose, erect, unbranched, with lines of hairs; leaves opposite or in whorls; petiole 3–8 mm; inflorescence spicate, 1.8–3 cm; calyx campanulate; corolla purple, ca. 2 cm, more than 2x as long as calyx.

1287. Pedicularis oederi Vahl



Phytogeographical element: EI-T, E-S Habitat: Fens and mires, alpine swards Elevational range: 3800 - 5000

Flowering period: VI - VII

Remarks: Cryptophyte; plant 3–25 cm high; drying black; stems glabrous in the bottom, woolly in the upper part; leaves mostly basal; petiole to 5 cm, pubescent; stem leaves 1 or 2 alternate; calyx 0.9–1.2 cm, tooth 5, equal; corolla yellow, with purple helmet (galea), more than 2 cm long.

1288. Pedicularis olgae Regel



Phytogeographical element: I-T Habitat: Steppes, forbs

Elevational range: 1200 - 3900 Flowering period: IV - VI

Remarks: Cryptophyte; plant 10–30 cm high, crown pale yellow, going pink to violet. It occurrs also in a pink form

(phot. 1313b, c).

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Orobanchaceae

1289. Pedicularis peduncularis Popov



Phytogeographical element: I-T Habitat: Fens and mires Elevational range: 2200 - 3400 Flowering period: VI - IX

Remarks: Cryptophyte; plant 10-25 cm high; root branched, fusiform-thickened; stem 2-4 × higher than basal leaves; leaves glabrous, alterante; corolla yellowishwhite with pale-violet beak and light-violet spot in the mounth of tube; beak at least as long as helmet.

1290. Pedicularis rhinanthoides Schrenk



Phytogeographical element: I-T Habitat: Fens and mires Elevational range: 2300 - 4400 Flowering period: V - VIII

Remarks: Cryptophyte; plant 10-25 cm high; stems multiple, 2-4 higher than basal leaves; cauline leaves alternate; corolla pink to dark violet, with bright spot in the mouth of corolla tube; helmet (galea) with long beak, equal to helmet or longer.

1291. Pedicularis uliginosa Bunge

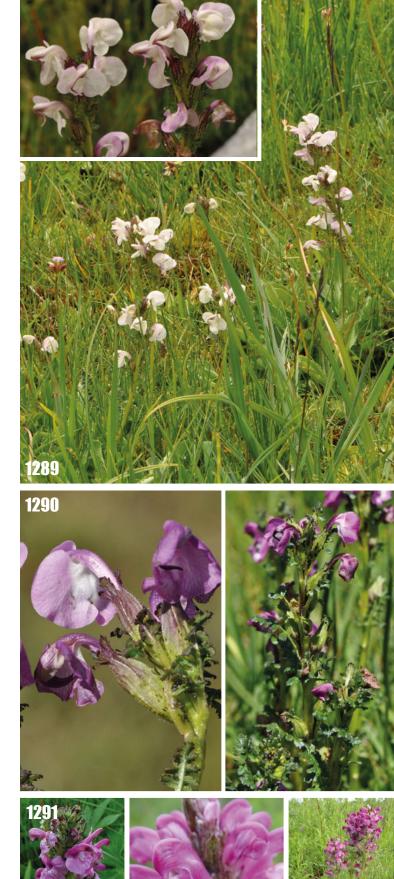


Phytogeographical element: EI-T

Habitat: Alpine meadows, fens and mires

Elevational range: 3400 - 4500 Flowering period: VII - VIII

Remarks: Cryptophyte; plant (5-)10-35 cm high; stems 1–4, slightly or 1.5–2 higher than basal leaves; stem leaves alternate; corolla pinkish-violet; helmet (galea) beakless.









1292. Phelipanche aegyptiaca (Pers.) Pomel

Synonyms: Orobanche aegyptiaca Pers.



Phytogeographical element: I-T, M, E-S

Habitat: Fields, steppes Elevational range: 350 - 1600 Flowering period: VI - IX

Remarks: Cryptophyte; plant; 15–40 cm high; stems often branched, corolla 2.5–3.5 cm, blue or light-violet; stigma white; host species: *Cucurbita* spp., *Solanum* spp.; *Nicotina* spp., and other cultivated plants.

1293. Phelipanche libanotica (Schweinf.) Soiák

Synonyms: Orobanche orientalis Beck, Phelipanche orientalis (G. Beck) Soják



Phytogeographical element: I-T Habitat: Steppes, thermophilous shrubs

Elevational range: 450 - 2000 Flowering period: IV - VII

Remarks: Cryptophyte; stems up to 40(–60) cm; calyx (7–)9 × 11 (–12) mm; corolla with upper lip deeply 2-lobed, lobes erect, triangular-lanceolate with subulate apex; lower lip deeply 3-lobed, lobes oblong-lanceolate, acute; host species: *Prunus* spp., *Amygdalus* spp.

1294. Rhinanthus borbasii (Dörfl.) Soó subsp. songaricus Soó

Synonyms: Rhinanthus songaricus (Sterneck) B. Fedtsch.



Phytogeographical element: I-T

Habitat: Riverside forests, meadows, fens and mires

Elevational range: 1200 - 1900 Flowering period: VI - VII

Remarks: Therophyte; plant up to 65 cm high; calyx

1.6–2 cm long, glandular.

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1295. Oxalis corniculata L.

Synonyms: Xanthoxalis corniculata (L.) Small



Phytogeographical element: Plurireg

Habitat: Broad-leaved forests, ruderal, fields, springs

Elevational range: 500 - 1500 Flowering period: V - VI

Remarks: Therophyte, hemicryptophyte; plant creeping, pubescent, rooting at the nodes; flowers 6–7 mm long; capsule 1–2.5 cm long, pubescent; seeds transversely

ribbed.

Usefulness: Med, For, Foo.

1296. Paeonia intermedia C.A. Mey.



Phytogeographical element: I-T, E-S

Habitat: Broad-leaved forests, alpine meadows, forbs

Elevational range: 2000 - 3000 Flowering period: VI - VII

Remarks: Cryptophyte; plant 50–90 cm high; stems 5–15, erect; leaves with long petioles, blades 13–17 cm long;

flower 8–13 cm in diameter. Usefulness: Med, Orn.

1297. Corydalis bucharica Popov



Phytogeographical element: I-T

Habitat: Rocks

Elevational range: 3200 - 3500 Flowering period: VI - VIII

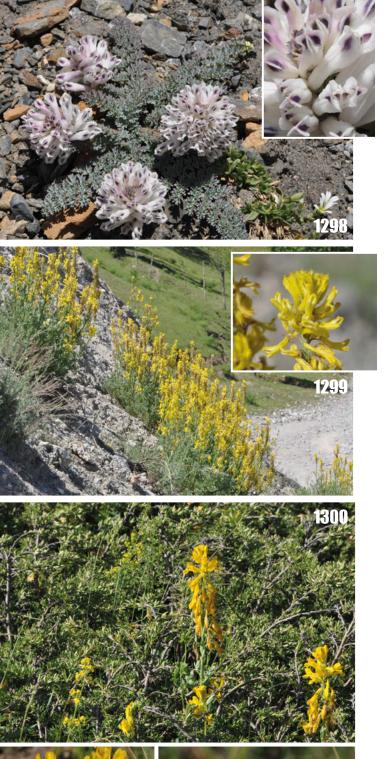
Remarks: Cryptophyte; plant 20–45 cm high; stem slightly furrowed; spur 1.5–2 mm wide, 4–7 mm long, $2–3\times$ shorter than petals, not saccate; capsule 13–18 mm long.













1298. Corydalis fedtschenkoana Regel



Phytogeographical element: I-T

Habitat: Fens and mires, moraines and snow-beds

Elevational range: 3100 - 4500 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 10–20 cm high, metallic grayglaucous; root elongate, narrow, branched; raceme dense,

20–40-flowered; capsule globose, inflated.

1299. Corydalis fimbrillifera Korsh.



Phytogeographical element: E, I-T Habitat: River beds, juniper forests, screes

Elevational range: 2000 - 3400 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 20–30 cm high; stem slightly furrowed; petiole of basal leaves 2–4 × shorter than leaf balde; bracts undulate-margined; sepals 7–10 mm long with long, filiform apex; corolla-limbs fimbriate; capsule 13–16 mm long, flattened.

1300. Corydalis gortschakovii Schrenk



Phytogeographical element: I-T

Habitat: Rocks, screes, moraines and snow-beds

Elevational range: 3000 - 4600 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 10–30 cm high; caudex with some residual long pale petiolar bases; basal leaves several; stem leaves 1–3; raceme densely 10–30-flowered; spur as long as petals; capsule 10–12 mm long, oblonglanceolate.

1301. Corydalis ledebouriana Kar. & Kir.



Phytogeographical element: I-T

Habitat: Alpine meadows, xeric shrubs, moraines and

snow-beds, forbs

Elevational range: 900 - 3600 Flowering period: III - V

Remarks: Cryptophyte; plant 10-25 cm high; tuber like a small potato; stems with 2 opposite, sessile leaves; raceme longer than leaves, 4–10(–14)-flowered; bracts margin entire; spur upwardly curved, $1.5-2 \times longer$ than petals;

capsule broadly lanceolate.

1302. Corydalis nudicaulis Regel



Phytogeographical element: E, I-T

Habitat: Juniper forests, broad-leaved forests, moraines

and snow-beds

Elevational range: 900 - 3200 Flowering period: IV - V

Remarks: Cryptophyte; plant 10-20 cm high, leaves on stem at intervals; petiole 5-15 cm long; raceme longer than leaves, laxly; bracts margin entire; spur upcurved, 2.5–3.5 wide; almost $1.5 \times longer$ than petals; capsule

linear-lanceolate.

1303. Corydalis popovii Nevski ex Popov



Phytogeographical element: E, I-T

Habitat: Broad-leaved forests, steppes, xeric shrubs

Elevational range: 900 - 1900 Flowering period: III - IV

Remarks: Cryptophyte; plant 10–20 cm high; stems with 2 opposite, sessile leaves; raceme 2-7-flowered, bracts 15-20 mm long, margin entire; spur downcurved, 3.5-5 mm wide, $2 \times loger$ than petals; capsule broadly lanceolate.





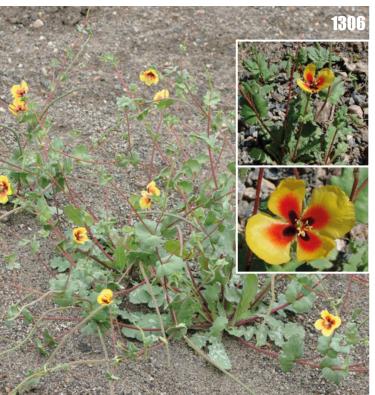












1304. Corydalis ruksansii Lidén



Phytogeographical element: SE, I-T Habitat: Alpine meadows, juniper forests

Elevational range: 1700 - 3300 Flowering period: IV - V

Remarks: Cryptophyte; plant 10-20 cm high; leaves on stem at intervals; petiole 1-3 cm long; raceme longer than leaves, laxly; flowers white with a slight blue or lilac suffusion and thin bluish or blue-grey thread-like lines on the inner petals; spur up-curved, 2-2.5 wide, $1.5 \times longer$ than petal.

1305. Corydalis stricta Steph. ex DC.



Phytogeographical element: I-T

Habitat: Juniper forests, alpine semi-deserts

Elevational range: 2500 - 4500 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 20–60 cm high; caudex covered with dry residues of leaves; leaves glaucous; raceme very dense, 20–50-flowered; spur saccate, 3–4 mm wide, 4–5 × shorter than petals; capsule 20–25 mm long, oblong.

1306. Glaucium elegans Fisch. & C.A. Mey.



Phytogeographical element: I-T Habitat: River beds, screes Elevational range: 400 - 3000 Flowering period: IV - VI

Remarks: Therophyte; plant 10–20 cm high; flower buds fusiform; petals yellow, reddish and black at base; capsule

dehiscing from base to apex.

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1307. Glaucium fimbrilligerum Boiss.



Phytogeographical element: I-T

Habitat: loose sandy screes, ruderal, fields

Elevational range: 800 - 2500 Flowering period: V - VII

Remarks: Hemicryptophyte; plant up to 60 cm high; flower buds fusiform; petals yellow or orange; capsules dehiscing

from apex to base. Usefulness: Orn.

1308. Glaucium squamigerum Kar. & Kir.



Phytogeographical element: I-T Habitat: River beds, loose sandy screes Elevational range: 2000 - 2800

Flowering period: V - VII

Remarks: Hemicryptophyte; plant up to 40 cm high; flower buds oval; petals yellow, not blotched; capsules dehiscing

from base to apex.

1309. Hypecoum parviflorum Kar. & Kir.

Synonyms: $Hypecoum\ pendulum\ L.\ var.\ parviflorum\ (Kar.\ & Kir.)\ Krylov$



Phytogeographical element: I-T

Habitat: Salt shrubs, steppes, thermophilous shrubs

Elevational range: 350 - 750 Flowering period: III - V

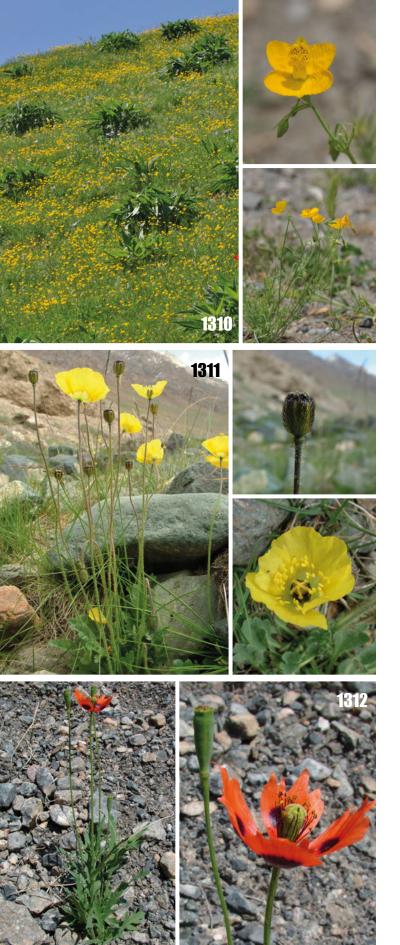
Remarks: Therophyte; plant up to 30 cm high; petals sulfur yellow, outer longer than wide; stigma lobes not

divergent. Usefulness: For.









1310. Hypecoum trilobum Trautv.



Phytogeographical element: I-T Habitat: River beds, fields, steppes Elevational range: 400 - 1000 Flowering period: III - V

Remarks: Therophyte; plant up to 35 cm high; petals bright yellow, outer wider than long; stigma lobes

diverging.

1311. Papaver croceum Ledeb.

Synonyms: Papaver angrenicum Pazij



Phytogeographical element: I-T, E-S

Habitat: Alpine swards, screes, moraines and snow-beds

Elevational range: 2900 - 4300 Flowering period: VII - IX

Remarks: Cryptophyte; plant 20–60 cm high; all leaves arranged at stem base; stems stiffly hairy, with bright hairs in lower part and reddish in the upper part of stem, sepals with dense reddish hairs; stamens 40–60, distinctly

exceed stigma. Usefulness: Med.

1312. Papaver dubium L.

Synonyms: Papaver litwinowii Fedde ex Bornm.



Phytogeographical element: I-T

Habitat: Juniper forests, thermophilous shrubs, forbs

Elevational range: 2700 - 2700 Flowering period: IV - VI

Remarks: Therophyte; plants 20–35(–45) cm high; sepals almost glabrous; petals with or without black blotch at

base; capsule oblong-obovate, glabrous.

1313. Papaver involucratum Popov



Phytogeographical element: E, I-T

Habitat: River beds, screes, nitrophilous rock footings

Elevational range: 2800 - 4600 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 10–25(–30) cm high; all leaves arranged at stem base; corolla bowl-shape, petals ca. 1 mm long; stamens up to 50, slightly exceed stigma;

capsule covered with appressed, light bristles.

1314. Papaver pavoninum C.A. Mey.



Phytogeographical element: I-T Habitat: River beds, screes, fields Elevational range: 380 - 3000 Flowering period: IV - VII

Remarks: Therophyte; plant 10–50 cm high; sepals densely covered with bristle; petals with black arcuate blotch at base; capsule obovate, up to 10 mm long, densely covered

with light, ascending bristles.

1315. Roemeria refracta DC.



Phytogeographical element: I-T

Habitat: Ruderal, fields, steppes, xeric shrubs,

thermophilous shrubs Elevational range: 700 - 3000 Flowering period: VI - VII

Remarks: Therophyte; plant 10–60 cm high; stems covered with some bright hairs; terminal leaf lobes linear, sepals glabrous or sparsely hairy; petals with black blotch at base, capsule 4–7 cm long, narrowed upwards, ussualy glabrous, rarely covered with appressed bristles.

Usefulness: Med.











1316. Sesamum indicum L.



Phytogeographical element: A, I-T, S-S

Habitat: Ruderal, fields Elevational range: 400 - 1600 Flowering period: VIII - IX

Remarks: Therophyte; plant up to 1.2 m high; stems 4-angled; leaves opposite or alternate, petiolate; leaf blade lanceolate to ovate, variously 3-parted, 4–20 × 2–10 cm, upper ones oblong to linear-lanceolate, margin entire; flowers white, pink, sometimes with darker markings; corolla 1.5–3.3 cm; capsule narrowly oblong, 15–30 × 6–7 mm; seeds horizontally arranged.

Usefulness: Med, For, Foo.

1317. Dodartia orientalis L.



Phytogeographical element: I-T, E-S

Habitat: River beds, screes, ruderal, fields, steppes, xeric

shrubs, forbs

Elevational range: 400 - 2200 Flowering period: IV - VIII

Remarks: Cryptophyte; plant 15–50 cm high, glabrous; stems with brown-yellow scales near base; leaves opposite or alternate; leaf blade scalelike to broadly linear, 1–4 cm, margin entire or sparsely toothed; racemes elongated, 3–7-flowered; calyx ca. 4 mm, subleathery, lobes broadly triangular; corolla purple to dark purple-red, 1.5–2.5 cm.

Usefulness: Med, For.

1318. Andrachne fedtschenkoi Kossinsky



Phytogeographical element: E, I-T

Habitat: Rocks

Elevational range: 1200 - 1800 Flowering period: V - VIII

Remarks: Chamaephyte; plant 3–15(–20) cm; stems numerous, straight, glabrous, slightly leafy; leaves green, petiolate; flowers 1–2(–3) in the axils of the leaves; petals half as long as sepals, white; anther filamants fused up tu

1/2 of their lenght.

1319. Andrachne pygmaea Kossinsky



Phytogeographical element: I-T

Habitat: Rocks

Elevational range: 1000 - 1100

Flowering period: V

Remarks: Chamaephyte; plant 3–10 cm; leaves blue-green, suborbicular to elliptic-ovate, glabrous; sepals 1.3–1.5 mm

long; anthers filamants fused only at base.

1320. Andrachne telephioides L.

Synonyms: Andrachne rotundifolia C.A. Mey., Andrachne virgatenuis Nevski



Phytogeographical element: I-T Habitat: Rocks, screes, ruderal, steppes

Elevational range: 450 - 1900 Flowering period: IV - VIII

Remarks: Cryptophyte; plant up to 30 cm high; leaves suborbicular to elliptic-ovate, glabrous; stipules white and/or purple; sepals 1.5–2 mm long; anthers filamants fused only at base; seeds almost rounded in outline.

1321. Hippuris vulgaris L.



Phytogeographical element: Plurireg

Habitat: Littoral vegetation, aquatic vegetation, water

bodies

Elevational range: 2300 - 4100 Flowering period: VI - IX

Remarks: Cryptophyte; plant 10-30 cm high,

heterophyllous, wholly or partly submerged; rhizome creeping, stout; leaves 6–12 in a whorl, sessile, 6–16 mm long, 1–2 mm broad, entire, glabrous; submerged leaves longer and thinner; flowers in the axils of short rigid emergent leaves; anther bilobed; fruit ovoid, 1.5–2 mm

long, 1–1.5 mm broad.



















1322. Kickxia elatine (L.) Dumort.



Phytogeographical element: I-T, M

Habitat: River beds, fields, thermophilous shrubs

Elevational range: 350 - 1700 Flowering period: V - IX

Remarks: Therophyte; plant 13-76 cm, densely pubescent; stems prostrate or decumbent; leaves $0.5-2.7 \times 0.4-2.1$ cm, pale green with very short petioles; leaf blades ovate to hastate; pedicels 0.7-2.4 cm long, bent; calyx 2.5-5 mm long, densely covered with long protruding hairs; corolla 6-8 mm, yellow purplish with purplish spur, 2-3 mm long.

1323. Lagotis decumbens Rupr.



Phytogeographical element: EI-T

Habitat: Screes, moraines and snow-beds

Elevational range: 3800 - 4900 Flowering period: VII - IX

Remarks: Cryptophyte; plant 8–15 cm high; stems 1–3, leafy (not scapose), prostrate to ascending; basal leaves 5–10; petiole 6–7 cm; leaf blade ovate-oblong to ovate-elliptic, 2.5–6 cm, margin coarsely serrate, apex obtuse; cauline leaves 3 or 4, leaf blade ovate, much smaller than basal leaves, margin obscurely toothed, apex acute; bracts ovate to broadly ovate; lower corolla lip 2- or 3-parted; style shorter than corolla tube.

1324. Lagotis ikonnikovii Schischk.



Phytogeographical element: I-T

Habitat: Alpine meadows, fens and mires

Elevational range: 2700 - 4700 Flowering period: VII - IX

Remarks: Cryptophyte; plant 10–38 cm high; stems 1–6(–10), leafy (not scapose), prostrate to ascending; margin of basal leaves entire or finely dentate; bracts ovate to broadly ovate; lower lip of corolla 2-parted; style longer than corolla tube.

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1325. Lagotis integrifolia (Willd.) Schischk.



Phytogeographical element: I-T

Habitat: Screes, moraines and snow-beds

Elevational range: 2000 - 3000 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 8-20 cm high; basal leaves petiolate 3-15 cm; leaf blade ovate-oblong to ovateelliptic, margin coarsely serrate, apex acute; cauline leaves smaller than basal leaves, apex acute; lower corolla lip 2-parted; style shorter than corolla tube.

1326. Lagotis korolkowii (Regel & Schmalh.) Maxim.



Phytogeographical element: SE, I-T Habitat: Alpine meadows, fens and mires

Elevational range: 2200 - 3600 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 1.5–5 cm high; without conspicuous main stem, or with 1-5 very short, leafy stems, sometimes decumbent, producing adventitious roots; basal leaves 1-4.5 cm long, 2-5 mm broad, linear to linear-lanceolate, with entire margin; inflorescence ovate,

loose; bracts linear-lanceolate.

1327. Linaria badachschanica Junussov



Phytogeographical element: I-T

Habitat: Screes

Elevational range: 2100 - 2600 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 60-100 cm high; bluish; 2-5 stems; leaves alternate, 4-9 cm long, linear-acicular with strongly revolute leaf margins; inflorescence glabrous; flowers large: calyx 2-5 mm; corolla 10-15 mm (without spur), and nectar spur 5-10 mm long; lips of corolla brownish to brownish-violet, corolla tube yellow.





















1328. Linaria bungei Kuprian.

Synonyms: Linaria transiliensis Kuprian.



Phytogeographical element: EI-T, E-S

Habitat: Steppe

Elevational range: 500 - 2000 Flowering period: VI - IX

Remarks: Cryptophyte; plant 30–50 cm high; stem often many branched from middle, glabrous; leaves alternate; leaf blade linear, 20–50 × 2–3 mm, glabrous; inflorescences spicate, with several to numerous flowers; calyx glabrous or sparsely with short glandular hairs; corolla purple, 1.2–1.5 cm, spur straight, 1–1.5 cm; capsule subglobose, 6 × 4.5 mm.

1329. Linaria popovii Kuprian.



Phytogeographical element: SE, I-T

Habitat: Screes, steppes, xeric shrubs, thermophilous

shrubs, forbs

Elevational range: 400 - 1300 Flowering period: IV - VIII

Remarks: Cryptophyte; plant 20–95 cm high; inflorescence glabrous, loose; leaves lanceolate with 1–3 veins; flower

peduncles 1-4 mm.

1330. Nanorrhinum ramosissimum (Wall.) Betsche

Synonyms: Kickxia ramosissima (Wall.) Janch.



Phytogeographical element: I-T, S-S

Habitat: Rocks

Elevational range: 1750 - 2000 Flowering period: V - VII

Remarks: Chamaephyte; plant 7–20 cm, densely pubescent; stems numerous, prostrate or decumbent; leaves pale green, petiolate; leaf blades hastate, apex acute; pedicels longer than perianth, bent; calyx densely covered with long protruding hairs; corolla yellow to yellow reddish, spur yellow.

1331. Plantago arachnoidea Schrenk ex Fisch. & C.A. Mey.



Phytogeographical element: I-T

Habitat: Alpine meadows, alpine steppes

Elevational range: 2600 - 4300 Flowering period: VI - VII

Remarks: Therophyte; plant 3-25 cm high; corolla

glabrous, 3–4 mm; leaves lanceolate.

1332. Plantago coronopus L.



Phytogeographical element: I-T, M, E-S

Habitat: Salt marshes

Elevational range: 400 - 3200 Flowering period: IV - V

Remarks: Therophyte, hemicryptophyte; plant 4–20(–25) cm high; corolla pilose, 3–4.5 mm; inflorescence 0.5–4 cm, leaves oblong-lanceolate, pinnatidentate to (bi-)

pinnatifid; segments linear to lanceolate.

1333. Plantago griffithii Decne.

Synonyms: *Plantago gentianoides* Sm. subsp. *griffithsii* (Decne.) Rech. f.



Phytogeographical element: I-T

Habitat: Alpine meadows, fens and mires

Elevational range: 2300 - 4300 Flowering period: V - VII

Remarks: Cryptophyte; plant 4–20(–25) cm high; leaves ovate-lanceolate, ovate or elliptical; inflorescence 0.5–4 cm long; corolla glabrous, 3–4.5 mm long; seeds

4–6, 1.5–2 mm long, almost smooth.























1334. Plantago lagocephala Bunge



Phytogeographical element: I-T Habitat: Semi-deserts, steppes Elevational range: 400 - 1200 Flowering period: III - IV

Remarks: Therophyte; plant 3–10 cm high; leaves linear lanceolate or lanceolate; petals pubescent; inflorescence

0.7-3 cm.

1335. Plantago maritima L.

Synonyms: Plantago salsa Pall.



Phytogeographical element: Plurireg

Habitat: Salt marshes

Elevational range: 3500 - 4500 Flowering period: VI - VII

Remarks: Cryptophyte; plant with rosette leaves strigillose, linear, $7-32 \times 0.2-0.8$ cm, leathery with 3 to 5 veins; spikes cylindric 5–17 cm, densely flowered; peduncle 10–35 cm, white strigillose; sepals 2.2–3 mm, keel, margin, and apex hirsutulous, keel thick and not extending to apex; corolla yellowish, tube outside pubescent; seeds brown, ellipsoid 1.6–2.3 mm.

1336. Plantago minuta Pall.



Phytogeographical element: I-T, E-S

Habitat: Steppes

Elevational range: 1500 - 1600 Flowering period: V - VI

Remarks: Therophyte; plant 2–7 cm high; pubescent; leaves lanceolate to linear; spikes capitate to shortly cylindric, 0.6–2 cm, densely flowered; peduncle (1–)2–12 cm, tenuous, along with rachis densely grayish to yellowish villous–lanate or sometimes glabrous; corolla glabrous, up to 33 mm long; calyx sepals free; capsules 2-seeded; seeds yellowish-brown, ellipsoid-ovoid to ellipsoid, (2.5–)3–4 mm, shiny, with a broad groove on ventral face.

1337. Veronica alpina L.

Synonyms: Veronicastrum alpinum Fourr.



Phytogeographical element: Plurireg Habitat: Alpine meadows, alpine swards

Elevational range: 2900 - 4500 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 5–10(–15) cm high, covered with protruding hairs; stems simple, slightly procumbent; leaves sessile, ovate, 0.7–2 \times 0.5–1 cm, margin subentire, apex obtuse; inflorescences short at anthesis, 2–3 cm in fruit; bracts oblanceolate, 3–4 mm; calyx 3–4 mm, elliptic; corolla longer than calyx; tube 1.5–2 mm, limb dark blue; capsule obcordate-ovoid, slightly compressed.

1338. Veronica anagallis-aquatica L.



Phytogeographical element: Plurireg

Habitat: Fields, salt marshes, littoral vegetation, aquatic

vegetation

Elevational range: 500 - 2400 Flowering period: IV - IX

Remarks: Cryptophyte; plant 12-40 cm high; stem glabrous; leaves $2-6.5 \times 0.5-2.5$ cm, ovate to linear; stem leaves often amplexicaul; corolla longer than calyx; styles short, 1.3-1.8 mm long, $2 \times$ shorter than capsule; calyx teeth equal to capsule or longer.

1339. Veronica anagalloides Guss.



Phytogeographical element: Plurireg

Habitat: Fields, littoral vegetation, aquatic vegetation

Elevational range: 350 - 2900 Flowering period: V - X

Remarks: Cryptophyte; plant 7–60 cm high; stem prostrate, the upper part glandular; leaves sessile, amplexicaul, $1-8\times0.4-3$ cm, lanceolate to linear; cauline leaves opposite; inflorescence a raceme; pedicels 4–5 mm long; calyx teeth free (or shortly fused); capsule elliptical, truncate at the top.





















1340. Veronica arguteserrata Regel & Schmalh.



Phytogeographical element: Plurireg Habitat: Ruderal, fields, steppes Elevational range: 500 - 3000 Flowering period: III - VIII

Remarks: Therophyte; plant 4–30(–40) cm high; stem pilose, glandular; cauline leaves opposite; inflorescence a raceme; pedicels 3–10 mm long; calyx 4-lobed, laterally more shallowly parted to 3/4 of length; corolla 1.5–2 × shorter than calyx; capsule obcordate, shorter than calyx, strongly compressed, 3.5–5 × 4–8 mm, apex notch 1/2–2/3 of capsule length and angled at 30–60; style, 0.8–1.5 mm, reaching about middle of notch.

1341. Veronica beccabunga L.



Phytogeographical element: Plurireg Habitat: Fens and mires, aquatic vegetation

Elevational range: 600 - 4000 Flowering period: VI - IX

Remarks: Cryptophyte; plant 4–22 cm high; stem hollow, glabrous; cauline leaves opposite, ovate, obtuse, with short petioles; leaf $7-22 \times 3-15$ mm; racemes 2–5 cm long, coming from leaves' axils; capsule 3–4 mm long and wide, nearly rounded.

Usefulness: Foo.

1342. Veronica biloba Schreb. ex L.



Phytogeographical element: I-T

Habitat: Alpine meadows, rocks, screes, forbs

Elevational range: 1800 - 4500 Flowering period: VI - IX

Remarks: Therophyte; plant (1–)4–15 cm high; stems sparcely pubescent, upper part glandular; cauline leaves opposite, leaf 4–15 mm 2–6 mm; pedicels under fruits straight; corolla 1.5–2 × shorter than calyx; style 0.4–0.8 mm, included in notch, 2 × shorter than capsule lobes; capsule pointing upwards, 3–4 mm long; seeds navicular; seed coat obscurely transversely rugose.

1343. Veronica bucharica B. Fedtsch.



Phytogeographical element: I-T

Habitat: Rocks, screes, steppes, thermophilous shrubs

Elevational range: 600 - 2000 Flowering period: III - VI

Remarks: Therophyte; plant 3–20 (–25) cm high; cauline leaves opposite; leaf 5–25 × 3–15 mm; inflorescence a raceme; pedicels pubescent 2–14 mm long; calyx 4-lobed, lobe 3.5–5 mm long; corolla 7–11 mm in diameter, 2 × longer than calyx; capsule reniform 5–7 mm 1–1.5 mm; capsule notched almost to the base; capsule lobes not bent, arranged nearly horizonhighy; seeds navicular; seed coat obscurely transversely rugose.

1344. Veronica campylopoda Boiss.



Phytogeographical element: I-T

Habitat: Screes, fields, steppes, thermophilous shrubs

Elevational range: 600 - 2500 Flowering period: IV - VII

Remarks: Therophyte; plant 3–20 (–30) cm high; stem shortly pubescent, often glandular; cauline leaves opposite, leaf 5–20 × 2–10 mm, with short petiole; inflorescence a raceme; pedicels arcuate, 4–12 mm long; calyx 4-lobed, calyx lobe 4–7 × 1–2 mm; corolla 1.5–2 × shorter than calyx; style 2–3 × shorter than capsule lobes; capsule dropping, obcordate, 3–4 mm wide, notched almost to the base; seeds navicular, narrowly ovoid; seed coat transversely 4–6–folded.

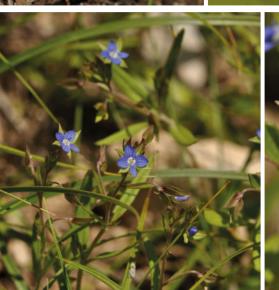
















1345. Veronica cardiocarpa (Kar. & Kir.) Walp.



Phytogeographical element: I-T

Habitat: Broad-leaved forests, rocks, screes, fields, steppes

Elevational range: 1300 - 3900 Flowering period: IV - VII

Remarks: Therophyte; plant 4–25 cm high; stems erect, pubescent; leaves 4, below inflorescence, ovate-oblong, 10–25 × 5–15 mm, widest in middle, base rounded, margin dentate; corolla 2–4 mm in diam.; calyx 4-lobed, 6–12 mm, ca. 2 as long as capsule; capsule obcordate, strongly compressed, 2–4.5 × 4.5–5.5 mm, deeply notched; capsule lobes ovate-orbicular, obtuse, apex short acuminate; style 0.5–0.8 mm, ca. 1/2 as long as notch.

1346. Veronica intercedens Bornm.



Phytogeographical element: I-T

Habitat: Rocks, loose sandy screes, screes, fields

Elevational range: 550 - 3000 Flowering period: IV - VII

Remarks: Therophyte; plant 5-20(-32) cm high; stems with short hairs; leaves $9-35(-45) \times 1.5-5(-8)$ mm, 4 spirally arranged or in two pairs, linear or linear lanceolate; corolla 4-5 mm in diam, bluish; calyx 4-lobed, 5-8 mm during fruiting; capsule $3-4 \times 4-5$ mm, parted up to 1/3, compressed; style up to 1 mm.

1347. Veronica persica Poir.



Phytogeographical element: Plurireg

Habitat: Orchards and gardens, ruderal, fields

Elevational range: 400 - 2000 Flowering period: II - IX

Remarks: Therophyte; plant 10–20 cm high, 20–50 cm long; stem diffuse; leaves opposite; leaf entire with short petiole; leaf blade 5–20 × 3–14 mm; leaf margin crenate; racemes terminal, lax, very long; one flower per bracteole's axil; pedicels 1.2–4 cm long, fruiting 2–4 longer than bracteoles; corolla blue, 7–12 mm in diameter, 2 × longer than calyx; capsule obcordate, 2-lobed, pubescent; 4–8 seeds per locule in the fruit.

1348. Veronica polita Fr.

Synonyms: Veronica didyma Ten.



Phytogeographical element: Plurireg

Habitat: Fields, steppes Elevational range: 300 - 2000 Flowering period: II - VIII

Remarks: Therophyte; plant 10-30 cm high, sparsely pubescent; leaves opposite, 1-3 pairs; leaf blade ovate to suborbicular, $5-11 \times 4-9$ mm, abaxially whitish hairy, adaxially sparsely pubescent to subglabrous, margin revolute with 2-4 deeply incised teeth per side; pedicels 2-15 mm long, equal to bracteoles; corolla light blue or pinkish, 4-6 mm in diameter, equal to calyx or slightly longer; capsule reniform, 2-lobed, pubescent.

Usefulness: Med.

1349. Veronica porphyriana Pavlov

Synonyms: Pseudolysimachion porphyrianum (Pavl.) Holub, Veronica spicata L. subsp. porphyriana (Pavl.) A. Jelen



Phytogeographical element: I-T

Habitat: Steppes, pseudosteppes, screes

Elevational range: 1500 - 2750 Flowering period: VI - VIII

Remarks: Cryptophyte; plant up to 30 cm high; stem densely glandural pubescent; leaves opposite, lanceolate, $2-5 \times 0.5-2$ cm crenate-dentate with obtuse apex; flowers in dense, terminal spike, bracts narrowly lanceolate; calyx deeply dissected to four lobes, glandular hairy, 3.5-4 mm; corolla dark blue with hairy tube inside; capsule ovoid,

3-3.5 mm, eglandular.





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1350. Veronica reuterana Boiss.



Phytogeographical element: I-T

Habitat: Broad-leaved forests, fields, thermophilous shrubs

Elevational range: 800 - 2300 Flowering period: III - VII

Remarks: Therophyte; plant 4–16 cm high; stem prostrate, glabrous at the bottom, sparcely glandular at the upper part; cauline leaves opposite, $(3-)5-12 \times (1.5-)2.5-8$ mm, ovate or round-ovate; inforescence a raceme; pedicel 3-10 mm long; corolla light blue, longer than calyx; calyx deeply incised, 4-lobed, 2–3 mm long; style equal to capsule lobes; capsule reniform, 2-lobed, notched up to 1/2 of the lenght, 3-3.5 mm long; seeds elliptical, oblate, glabrous.

1351. Veronica spuria L.

Synonyms: Pseudolysimachion spurium (L.) Rauschert



Phytogeographical element: Plurireg

Habitat: Steppes

Elevational range: 1400 - 2800 Flowering period: VI - VIII

Remarks: Cryptophyte; plant up to 80 cm high, erect, apically branched, densely pubescent; leaf blade narrowly oblong to elliptic $3-8 \times 1-3$ cm, puberulent, margin deeply dentate, upper leaves often subentire; inflorescences several to numerous racemes, short glandular hairy; calyx ca. 2 mm; corolla purple to blue 5–6 mm; capsule $2.5-3.5 \times 2-2.5$ mm.

1352. Veronica verna L.



Phytogeographical element: I-T, E-S, M Habitat: Loose sandy screes, screes, steppes

Elevational range: 1100 - 3400 Flowering period: IV - VII

Remarks: Therophyte; plant 5-25 cm high; stems simple or fastigiate, lower part shortly pubescent, upper with glandular trichomes, often reddish; leaves early deciduous, lower ones short petiolate, middle sessile; leaf blade ovate, pinnatifid, $5-12 \times 4-7$ mm; pedicels very short 1-2 mm; corolla pale blue to blue-purple, ca. 1/2 as long as calyx; calyx with 4, lanceolate, 3-veined lobes; style less than 1 mm, shorter to almost as high as notch.

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Plantaginaceae

1353. Veronica rubrifolia Boiss.

Synonyms: Veronica ferganica M. Pop



Phytogeographical element: I-T

Habitat: Loose sandy screes, alpine pastures, screes, moraines

and snow-beds

Elevational range: 2000 - 4400 Flowering period: V - VIII

Remarks: Therophyte; plant 1–8 cm high; stems often reddish, pubescent; leaf blade ovate to ovate-oblong, margin entire or shallowly incised; corolla white or pale blue, shorter than calyx; calyx 4-lobed, 3–4.5(–6) mm; capsule 3–3.5 \times 4–5 mm, slightly shorter than calyx, parted up to 1/2–2/3 with sharp angle between parts; capsule lobes ovate, margin red glandular ciliate, glabrous or eglandular puberulent; style ca. 0.5 mm.

1354. Platanus orientalis L.



Phytogeographical element: M, I-T

Habitat: Broad-leaved forests, riverside forests

Elevational range: 400 - 2000 Flowering period: IV - V

Remarks: Megaphanerophyte; trees deciduous, to 30 m high; fruiting branchlets with (2 or)3–5 infructescences; leaf blade broadly ovate, 9–18 × 8–16 cm, deeply (3 or)5- or 7-lobed, both surfaces gray-yellow pubescent, central leaf lobe longer than wide; stipules less than 1 cm; flowers 4-merous; basal hairs of achienes exserted from infructescence.

Usefulness: Orn.

1355. Acantholimon alatavicum Bunge



Phytogeographical element: EI-T Habitat: Screes, rocks

Elevational range: 1700 - 3600 Flowering period: V - IX

Remarks: Chamaephyte; cushions 30–40(–100) cm wide; leaf blade glaucous, glabrous; inflorescences unbranched; peduncle 3–6 cm, densely pubescent; spike ca. 2 cm, with 5–8 spikelets; spikelets 1-flowered; bracts glabrous; calyx 1–1.2 cm, limb white.

1353















1356. Acantholimon alexeenkoanum Czerniak, ex Ikonn.



Phytogeographical element: I-T Habitat: Screes, rocks, steppes Elevational range: 2000 - 4400 Flowering period: VI - VIII

Remarks: Chamaephyte; cushions 5–25 cm wide; leaf 4–8 cm long and 0.9–1.5 mm wide, glabrous; peduncles 1–1.5 cm high; spike with 1–3 spikelets; calyx ca. 7 mm, limb white; corolla light-pink.

1357. Acantholimon anzobicum Lincz.



Phytogeographical element: E, I-T Habitat: Rocks, screes, forbs Elevational range: 2400 - 3600 Flowering period: VII - IX

Remarks: Chamaephyte; cushions 20–40 cm wide, loose, flatted; leaves short 0.5–1.2 cm long and 0.5–1 mm wide; calyx 1–1.1 cm long, limb white-pink; corolla white-pink.

1358. Acantholimon compactum Korovin



Phytogeographical element: I-T Habitat: Screes, rocks, steppes Elevational range: 1500 - 2000 Flowering period: VII - VIII

Remarks: Chamaephyte; cushions 5–15 cm wide; leaf 0.5–1.5 (–2.5) cm long and 1–1.5 mm wide, glabrous; peduncles 15–20 cm high; spike with 5–8 spikelets 2–3-flowered; calyx 10–12 mm, limb pink; corolla pink.

1359. Acantholimon diapensioides Boiss.



Phytogeographical element: EI-T

Habitat: Alpine steppes, moraines and snow-beds

Elevational range: 2900 - 4500 Flowering period: VII - IX

Remarks: Chamaephyte; cushions 30-70(-120) cm wide; leaf blade usually pale glaucous, lanceolate to linear, $1.5-4(-5) \times 0.6-0.9$ mm; inflorescences without a rachis; spikelets (1-)2 or 3; calyx 5-6.5 mm, limb white; corolla pink.

1360. Acantholimon hedinii Ostenf.



Phytogeographical element: SE, EI-T

Habitat: Steppes

Elevational range: 3200 - 4700 Flowering period: VII - IX

Remarks: Chamaephyte; cushions 20–70 cm wide; leaf blade pale glaucous, lanceolate to linear, $4-8\times0.6-0.8$ mm; inflorescences without a rachis; spikelets (1 or)2 or 3; calyx ca. 7–8.5 mm, limb white; corolla pink.

1361. Acantholimon hilariae Ikonn.



Phytogeographical element: I-T

Habitat: Alpine meadows, alpine steppes

Elevational range: 2700 - 4300 Flowering period: VII - VIII

Remarks: Chamaephyte; cushions 25–45 (90) cm wide; leaf 0.8–1.6 cm long and 1 mm wide, shortly pubescent; peduncles 1.8–3 cm high; spikelets 3–4(7); calyx 8–10 mm, limb white; corolla white to white-pink.















1362. Acantholimon komarovii Czerniak.



Phytogeographical element: E, I-T Habitat: Rocks, screes, steppes Elevational range: 2500 - 3400

Flowering period: VII

Remarks: Chamaephyte; cushions 10-20 cm wide; leaf 0.5-1 cm long and 0.5-1 mm wide; peduncles up to 2 cm high; spikelets 3-7; calyx 7-9 mm, limb white; corolla

pink.

1363. Acantholimon korolkovii (Regel) Korovin



Phytogeographical element: I-T Habitat: Screes, rocks, steppes Elevational range: 2200 - 3900 Flowering period: VII - VIII

Remarks: Chamaephyte; cushions 30–40(–60) cm wide; leaf 0.5–1(–1.5) cm long and ca. 1 mm wide, pubescent; peduncles 2-6 cm high, pubescent; spike with 1-flowered spikelets, calyx 7–12 mm, limb white; corolla pink.

1364. Acantholimon laxum Czerniak.



Phytogeographical element: I-T Habitat: Screes, rocks Elevational range: 2000 - 2500

Flowering period: VI - IX

Remarks: Chamaephyte; cushions 15–25 cm wide; summer leaf blade glaucous, linear needle-like, 2.0-2.5 cm \times 1-1.5 mm, rigid, glabrous, apex shortly awned; spikelets 1-flowered, 11-12 mm; bracts glabrous 4 mm; calyx 10-11 cm, limb purple, corolla rose-purple.

1365. Acantholimon parviflorum Regel



Phytogeographical element: E, I-T

Habitat: Steppes, forbs Elevational range: 1200 - 3900 Flowering period: VI - VII

Remarks: Chamaephyte; cushions 20–160 cm wide; leaf 2–3.5 (–4.5) cm long and 1–1.5 mm wide; peduncles 15–25(–40) cm high; spikelets 5–7(–10) with one flower;

calyx 7–8 mm, limb white; corolla pink.

1366. Cephalorhizum popovii Lincz.



Phytogeographical element: E, I-T

Habitat: Steppes

Elevational range: 550 - 1500 Flowering period: V - VI

Remarks: Cryptophyte; plant 30–60 cm high; leaves bluish; calyx 7–8 mm long and is covered by a bract not longer than half its length; calyx tube velvety soft as bracts

1.5 mm diameter.

1367. Chaetolimon setiferum (Bunge) Lincz.



Phytogeographical element: SE, I-T

Habitat: Screes, forbs Elevational range: 800 - 1100 Flowering period: IV - VI

Remarks: Cryptophyte; plant 20–35 cm high; calyx

1–1.5 mm in diameter with narrow veins.





























1368. Chaetolimon sogdianum Lincz.



Phytogeographical element: I-T

Habitat: Steppes, thermophilous shrubs, forbs

Elevational range: 850 - 1400 Flowering period: V - VII

Remarks: Cryptophyte; plant 20–90 cm high; spikelets tightly pressed to the axis of peduncle; calyx almost completely hidden under the external bract.

1369. Goniolimon orthocladum Rupr.



Phytogeographical element: EI-T

Habitat: Steppes

Elevational range: 1400 - 2700 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 5–65 cm high; leaves oblanceolate or obovate, 5–14 × 1–3.5 cm, thin, base attenuate, apex acuminate; inflorescences capitate, spikes with 7–11 spikelets; spikelets 3–5-flowered; calyx 7–8 mm, tube 1.2–1.5 mm in diameter, veins purple and reaching to or extending beyond middle of limb.

1370. Limonium komarovii Ikonn.-Gal.



Phytogeographical element: E, I-T Habitat: Salt marshes, alpine steppes Elevational range: 1000 - 2800 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 35–50(–70) cm high; inflorescence loose; flowers with peduncles 1.5–2 mm.

1371. Limonium otolepis (Schrenk) Kuntze



Phytogeographical element: I-T

Habitat: Riverside forests, fields, salt shrubs, salt marshes

Elevational range: 350 - 550 Flowering period: V - IX

Remarks: Cryptophyte; plant 30–90(–120) cm high; leaves on main branches of inflorescences clasping, rounded or

reniform; calyx obconical, 2.2-2.5 mm.

Usefulness: Foo, Orn.

1372. Limonium reniforme (Girard) Lincz.



Phytogeographical element: I-T

Habitat: Riverside forests, fields, salt shrubs, salt marshes

Elevational range: 450 - 1400 Flowering period: V - X

Remarks: Cryptophyte; plant 60–80(–120) cm high; leaves present on stem and within inflorescence, calyx 3–4 mm

long.

Usefulness: Ind.

1373. Limonium suffruticosum (L.) Kuntze



Phytogeographical element: I-T, E-S Habitat: Salt shrubs, salt marshes Elevational range: 500 - 700 Flowering period: VII - X

Remarks: Chamaephyte; plant 10-30(60) cm high; leaves $0.5-7 \times 0.2-1$ cm; stems covered by lightly colored scarious scales; inflorescences interrupted spicate.

Usefulness: For.









1372



















1374. Psylliostachys leptostachya Roshk.



Phytogeographical element: I-T Habitat: Salt shrubs, salt marshes Elevational range: 350 - 700 Flowering period: IV - V

Remarks: Therophyte; plant (5–)10–20(–50) cm high; leaves (2.5–)4–10(–15) cm long, outline lanceolate very deeply lobed (almost to the middle vein); calyx lobes with a long spike-shaped tip; corolla white or rose.

Usefulness: Ind.

1375. Psylliostachys × myosuroides (Regel) Roshkova



Phytogeographical element: I-T Habitat: Salt shrubs, salt marshes Elevational range: 600 - 1400 Flowering period: IV - V

Remarks: Therophyte; plant (10–)15–30(–50) cm high; leaves (5–)10–15(–20) cm long, outline lanceolate very deeply lobed, lobes narrow and linear; calyx lobes with a long spike-shaped tip; corolla pink or dark pink or white.

1376. Psylliostachys suworowii Roshk.



Phytogeographical element: I-T Habitat: Fields, salt marshes Elevational range: 350 - 1800 Flowering period: IV - VI

Remarks: Therophyte; plant 10–50(–80) cm high; leaves 5–15(–20) cm long with margins entire to deep-lobed;

inflorescences very dense, thick; corolla pink.

Usefulness: Foo, Orn.

1377. Achnatherum caragana (Trin.) Nevski

Synonyms: Stipa caragana Trin.



Phytogeographical element: I-T Habitat: Screes, steppes Elevational range: 1100 - 2500 Flowering period: V - VI

Remarks: Cryptophyte; plant 50-120 cm high, panicle

open; glumes 4–5 mm; awn 7–10 mm.

1378. Achnatherum jacquemontii Jaub. & Spach.

Synonyms: Achnatherum botschanzevii Tzvelev



Phytogeographical element: EI-T

Habitat: Rocks, screes

Elevational range: 1900 - 2000 Flowering period: VI - VI

Remarks: Cryptophyte; plant 15–30 cm high; panicle contracted; glumes 5–6 mm; awn 20–30 mm.

1379. Achnatherum sibiricum (L.) Keng ex Tzvelev

Synonyms: Stipa sibirica (L.) Lam.



Phytogeographical element: I-T, C-A Habitat: Rocks, screes, steppes Elevational range: 900 - 1100 Flowering period: VII - VI

Remarks: Cryptophyte; plant 70–150 cm high; panicle contracted; glumes 7–10 mm, yellowish green or purple;

awn 15-20 mm.



















1380. Aegilops cylindrica Host



Phytogeographical element: I-T, M, E-S

Habitat: Meadows, steppes Elevational range: 500 - 1050 Flowering period: IV - V

Remarks: Therophyte; plant 20-50(-70) cm high; spikelets

6–10 cm long; glumes with 1 awn and 2 teeth.

Usefulness: For.

1381. Aegilops tauschii Coss.

Synonyms: Aegilops squarrosa L.



Phytogeographical element: I-T

Habitat: Steppes

Elevational range: 500 - 1800 Flowering period: IV - V

Remarks: Therophyte; plant 20-50 cm high; glumes

4–6 mm, without teeth or fine dentate.

Usefulness: For.

1382. Aegilops triuncialis L.



Phytogeographical element: I-T Habitat: Meadows, forbs Elevational range: 375 - 1900 Flowering period: IV - V

Remarks: Therophyte; plant 15–45 cm high; spikes 3–6 cm long (excluding the awns), glumes of lowest spikelet 7–10 mm long, usually with 3 teeth, 2–3 of which form

awns

1383. Aeluropus littoralis (Gouan) Parl.



Phytogeographical element: I-T, M, E-S Habitat: River beds, salt marshes Elevational range: 350 - 2700 Flowering period: IV - VI

Remarks: Cryptophyte; plant 20–50 cm high; culm and leaves glabrous; spikelet with 6–8(–10) flowers.

Usefulness: For.

1384. Agropyron cristatum (L.) Geartn.



Phytogeographical element: I-T, C Asia

Habitat: Steppes, thermophilous shrubs, semi deserts

Elevational range: 500 - 2500 Flowering period: V - VI

Remarks: Cryptophyte, plant 20–60(–80) cm tall; spike oblong-ovoid, 0.8–1.5 cm wide; spikelets 6–9(–12) mm,

with (3-)5-7 florets.

1385. Alopecurus himalaicus Hook. f.



Phytogeographical element: EI-T

Habitat: Fens and mires, alpine semi-deserts

Elevational range: 3100 - 4000 Flowering period: VI - VII

Remarks: Cryptophyte; plant 15–50 cm high; glume apex sharply acuminate to awnlike; lemma shorter than

glumes.













1386. Alopecurus mucronatus Hack.



Phytogeographical element: E, EI-T Habitat: Alpine meadows, fens and mires

Elevational range: 3000 - 4200 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 5–12 cm high; glumes with

awns.

Usefulness: For.

1387. Alopecurus myosuroides Huds.



Phytogeographical element: I-T, M Habitat: River beds, ruderal Elevational range: 350 - 950 Flowering period: IV - V

Remarks: Cryptophyte; plant 20–40 cm high; lemma awned; the awn exceeding the glume tips by 4–8 mm;

anthers 3–4 mm long. Usefulness: For.

1388. Alopecurus pratensis L.

Synonyms: Alopecurus seravschanicus Ovcz.



Phytogeographical element: E, I-T Habitat: Alpine meadows, fens and mires

Elevational range: 2000 - 2600 Flowering period: VI - VII

Remarks: Cryptophyte; plant up to 100 cm high; glume apices straight or slightly converging; awn long exserted,

arising from lower 1/4 of lemma.

1389. Anthoxanthum alpinum Á. Löve & D. Löve

Synonyms: *Anthoxanthum odoratum* L. subsp. *alpinum* (á. Löve & D. Löve) Tzvelev



Phytogeographical element: I-T, E-S Habitat: Meadows, steppes Elevational range: 2000 - 3200 Flowering period: VI - VII

Remarks: Cryptophyte; plant 15–25 cm; leaf blades always glabrous; panicle 2–3 cm, pedicels glabrous; spikelets with

glabrous glumes.

1390. Apera interrupta (L.) P. Beauv.



Phytogeographical element: Plurireg Habitat: Meadows, steppes Elevational range: 900 - 2000 Flowering period: V - VII

Remarks: Therophyte; plant 10–40 cm; leaves 1–3 mm wide; panicle compressed, 3–18 cm; lemma 1.5–1.9 mm

with 8-13~mm long awn.

1391. Aristida adscensionis L.

Synonyms: Aristida heymannii Regel



Phytogeographical element: Plurireg Habitat: Semi-deserts, deserts, steppes Elevational range: 1500 - 2000

Flowering period: V - VIII

Remarks: Therophyte; plant 15–55 cm high; glumes subequal; lemma linear, distinctly longer than upper glume; awn branches arising directly from lemma apex; central branch 1–2.5 cm, laterals slightly shorter.











1392. Arundo donax L.



Phytogeographical element: I-T, M, E-S

Habitat: River beds, ruderal Elevational range: 450 - 900 Flowering period: VIII - IX

Remarks: Cryptophyte; plant 2–6 m tall; panicle 30–60 cm;

lemmas 8–11 mm, hairs 5–6 mm.

1393. Avena sativa L.



Phytogeographical element: Cultivated

Habitat: Cultivated on fields Elevational range: 450 - 2500 Flowering period: V - VII

Remarks: Therophyte; plant 40–180 cm high; rachilla tough, spikelets not regularly disarticulating; glumes as long as spikelet; lemmas leathery, distinctly veined in

upper half.

1394. Avena sterilis L. subsp. ludoviciana (Durieu) Gillet & Magne

Synonyms: Avena trichophylla C. Koch



Phytogeographical element: I-T, M Habitat: Meadows, fields, forbs Elevational range: 700 - 2100 Flowering period: V - VI

Remarks: Therophyte; plant 30–120 cm high; glumes

equal, awn beneath bent, shortly hispid.

1395. Boissiera squarrosa (Sol.) Nevski

Synonyms: Euraphis squarrosa (Banks & Sol.) Soják, Pappophorum squarrosum Banks & Sol.



Phytogeographical element: , I-T, M

Habitat: Juniper forests, loose sandy screes, ruderal, fields,

steppes, xeric shrubs

Elevational range: 350 - 2550 Flowering period: IV - VI

Remarks: Therophyte; plant 5–25 cm high, leaves and sheaths shortly pubescent, panicle very dense, ospikelets several flowered, lemma prominently (5–)9-nerved, the nerves excurrent below the tip as recurved awns flattened at the base.

1396. Bothriochloa bladhii (Retz.) S.T. Blake

Synonyms: Bothriochloa caucasica (Trin.) C.E. Hubb.



Phytogeographical element: I-T, M Habitat: River beds, ruderal Elevational range: 600 - 1200 Flowering period: V - VIII

Remarks: Cryptophyte; plant 40–150 cm high; inflorescence more or less dense, with more than 12

racemes.

1397. Bothriochloa ischaemum (L.) Keng

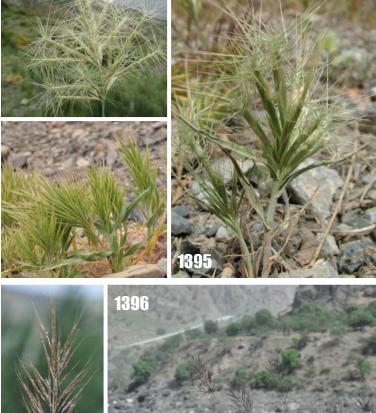


Phytogeographical element: I-T, E-S, M, Orient

Habitat: River beds, fields, steppes Elevational range: 500 - 2300 Flowering period: V - VIII

Remarks: Cryptophyte; plant 20-80 cm high; inflorescence

with 2-10 racemes, subdigitate.









1398. Brachypodium distachyon (L.) P. Beauv.

Synonyms: Trachynia distachya (L.) Link



Phytogeographical element: I-T, M Habitat: Screes, steppes Elevational range: 500 - 1000 Flowering period: IV - VI

Remarks: Therophyte; plant 10–30 cm high; spikelets 2–3 cm, laterally compressed, florets 10–16; glumes pilose or glabrous, apex acute, lemmas 7.5–10 mm, glabrous, thinly setose or pubescent; awn 7–15 mm; anthers 0.5–1 mm.

1399. Brachypodium sylvaticum (Huds.) P. Beauv.



Phytogeographical element: I-T, E-S, M Habitat: Broad-leaved forests, riverside forests

Elevational range: 800 - 2100 Flowering period: VI - VII

Remarks: Cryptophyte; plant 60-110 cm high; tussock-

forming plant with short rhizomes.

1400. Bromus alaicus Korsh.

Synonyms: Littledalea alaica (Korsh.) Petrov ex Kom.



Phytogeographical element: I-T Habitat: Screes, steppes Elevational range: 3000 - 3200 Flowering period: VI - VII

Remarks: Therophyte; plant 15–25 cm; panicle with 4–10 spikelets; glumes 1.2–17 mm; lemma 8–10 mm, awnless.

1401. Bromus danthoniae Trin.



Phytogeographical element: I-T

Habitat: River beds, meadows, steppes, thermophilous

shrubs, forbs

Elevational range: 2600 - 3000 Flowering period: IV - VI

Remarks: Therophyte; plant 10–40 cm high; lemmas usually 3-awned, central awn 15–25 mm, base flattened, twisted, recurved, lateral awns 4–10 mm, straight or recurved; palea shorter than lemma.

Usefulness: For.

1402. Bromus gracillimus Bunge

Synonyms: Nevskiella gracillima (Bunge) V. Krecz. & Vved.



Phytogeographical element: I-T

Habitat: River beds, steppes, xeric shrubs

Elevational range: 2100 - 4100 Flowering period: V - VII

Remarks: Therophyte; plant 8–30 cm high; awn 4–6 times length of lemma; lemma apex minutely 2-toothed.

1403. Bromus inermis Leyss.

Synonyms: Zerna inermis (Leyss.) Lindm.



Phytogeographical element: I-T, M, E-S Habitat: River beds, steppes, xeric shrubs

Elevational range: 1000 - 2500 Flowering period: V - VII

Remarks: Cryptophyte; plant 40–120 cm high, with spreading rhizomes; panicle ca. 20 cm; lemmas awnless or

with very short (up to 15 mm) awn.



1402









1403













1404. Bromus japonicus Thunb.



Phytogeographical element: Plurireg Habitat: River beds, steppes, xeric shrubs

Elevational range: 500 - 2800 Flowering period: IV - VI

Remarks: Therophyte; plant 15–40 cm high; panicle unilaterale at maturity; lemmas elliptic, 8–10 × ca. 2 mm in side view, awned from 1–2 mm below apex; awn 5–10 mm, longer on upper lemmas than lower lemmas, base slightly flattened, conspicuously recurved at maturity.

1405. Bromus lanceolatus Roth

Synonyms: Bromus macrostachys Desf.



Phytogeographical element: I-T, M

Habitat: Meadows, steppes, thermophilous shrubs

Elevational range: 350 - 2800 Flowering period: IV - VII

Remarks: Therophyte; plant 25–70 cm high; spikelets broadly elliptic, ca. 10 mm wide; lemma smooth, with apex shallowly toothed, teeth 1–2 mm; panicle slightly contracted, branches not longer than spikelets, obliquely

ascending.
Usefulness: For.

1406. Bromus oxyodon Schrenk



Phytogeographical element: I-T

Habitat: Meadows, steppes, thermophilous shrubs

Elevational range: 650 - 2800 Flowering period: IV - VI

Remarks: Therophyte, hemicryptophyte; plant 30–70 cm high; spikelets oblong-lanceolate, ca. 6 mm wide; lemma apex deeply toothed, teeth (1.5–)3–4 mm; panicle open, branches several times longer than spikelets, lower glume ca. 10 mm; lemma 15–18 mm, awn 20–25 mm, lower part slightly flattened, twisted, conspicuously recurved.

Usefulness: For.

566

Poaceae

1407. Bromus paulsenii Hack.

Synonyms: Bromopsis pamirica (Drobow) Holub, Bromopsis paulsenii (Hackel ex Paulsen) Holub, Bromopsis paulsenii subsp. pamirica (Drobow) Tzvelev, Bromopsis paulsenii subsp. turkestanica (Drobow) Tzvelev, Bromopsis turkestanica (Drobow) Holub., Zerna turkestanica (Drob.) Nevski



Phytogeographical element: SE, I-T Habitat: Juniper forests, steppes Elevational range: 2300 - 3600 Flowering period: VII - VIII

Remarks: Cryptophyte; plant tufted, 20–40 cm high; pubescent or upper part often glabrous leaf blades densely pubescent; glumes lanceolate, glabrous, lower glume 6–8 mm, 3–5-veined, upper glume 8–10 mm, 3–5-veined; lemmas broadly lanceolate, ca. 10 mm, glabrous, smooth or scabrid; awn 3–5 mm, straight.

Usefulness: For.

1408. Bromus scoparius L.



Phytogeographical element: I-T, M

Habitat: River beds, semi-deserts, ruderal, fields,

thermophilous shrubs, forbs Elevational range: 750 - 2800 Flowering period: IV - VII

Remarks: Therophyte, hemicryptophyte; plant 8–30 cm high; panicle dense, 3–6 mm long, with many spikelets; lemmas

7–8 mm, apical teeth 1.3–2.5 mm.

Usefulness: For.

1409. Bromus sterilis L.

Synonyms: Anisantha sterilis (L.) Nevski



Phytogeographical element: Plurireg

Habitat: River beds, ruderal, steppes, thermophilous shrubs

Elevational range: 700 - 1800 Flowering period: IV - V

Remarks: Therophyte; plant 30–80 cm high; panicle lax, branches up to 10 cm, with 1 or no branchlets; spikelets

sparse, 1 or 2 per branch.

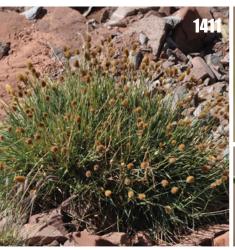






















1410. Bromus tectorum L.

Synonyms: Anisantha tectorum (L.) Nevski



Phytogeographical element: I-T, E-S, M

Habitat: Juniper forests, rocks, screes, ruderal, steppes,

xeric shrubs

Elevational range: 400 - 3700 Flowering period: IV - VI

Remarks: Therophyte; plant 10–35 cm high; panicle branches longer or shorter than spikelets, pubescent;

spikelets 1–8 per branch.

Usefulness: For.

1411. Calamagrostis anthoxanthoides (Munro) Regel

Synonyms: Stilpnophleum anthoxanthoides (Munro) Nevski



Phytogeographical element: EI-T

Habitat: Screes

Elevational range: 2700 - 4000

Flowering period: VI - VIII

Remarks: Cryptophyte; plant tufted, shortly rhizomatous; culms erect, 10-35 cm; panicle very dense, spikelike, broadly oblong to ovate in outline, $2-4 \times 1.2-2$ cm, light brownish purple becoming golden.

1412. Calamagrostis anthoxanthoides (Munro) Regel. subsp. laguroides (Regel) Tzvelev

Synonyms: Calamagrostis laguroides Regel, Stilpnophleum anthoxanthoides (Regel) Nevski



Phytogeographical element: I-T

Habitat: Juniper forests, screes, steppes

Elevational range: 1900 - 2500 Flowering period: VI - VII

Remarks: Cryptophyte; plant tufted, shortly rhizomatous; culms erect, 40–90 cm; panicle very dense, spikelike, broadly oblong in outline, 4–6 \times 1.2–2 cm, light brownish purple.

568

Poaceae

1413. Calamagrostis pseudophragmites (Haller f.) Koeler

Synonyms: Calamagrostis glauca (M. Bieb.) Rchb.



Phytogeographical element: I-T, Orient, E-S Habitat: River beds, riverside forests Elevational range: 550 - 3250 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 50–110 cm high; lower glume

membranous, 3-veined, inflorescence pendent.

Usefulness: For.

1414. Calamagrostis tianschanica Rupr.

Synonyms: Deyeuxia tianschanica (Rupr.) Bor



Phytogeographical element: EI-T Habitat: Fens and mires, salt marshes Elevational range: 3300 - 4400 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 15–30 cm high; panicle dense, spikelike; spikelets 4–6 mm, purple; awn geniculate with twisted column, conspicuously exceeding glumes;

anthers 1.5–2 mm. Usefulness: For.

1415. Catabrosa aquatica (L.) P. Beauv.



Phytogeographical element: Plurireg Habitat: River beds, ditches, roadsides Elevational range: 1200 - 3600

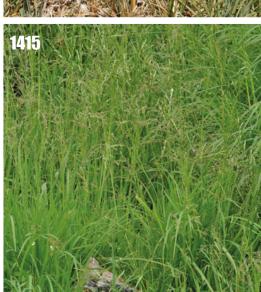
Flowering period: V - VII

Remarks: Cryptophyte; plant 20-70 cm tall; panicle loose,

open, branches to 10 cm; lemma 2-3 mm.









1416. Catabrosa capusii Franch.



Phytogeographical element: I-T Habitat: Littoral vegetation Elevational range: 2500 - 3000 Flowering period: VI - VII

Remarks: Cryptophyte; plant 10–40 cm tall; panicle narrow, contracted; branches adpressed or suberect; spikelets with (1–)2 florets, 3–4 mm long; lemma

2–2.7 mm.

1417. Colpodium leucolepis Nevski

Synonyms: Paracolpodium leucolepis (Nevski) Tzvelev



Phytogeographical element: I-T, E-S

Habitat: Alpine meadows, alpine pastures, salt marshes

Elevational range: 3800 - 4700 Flowering period: VI - VII

Remarks: Cryptophyte; plant 10–25 cm tall; panicle compressed, 5–8 cm with short branches; lemma acute at

the apex.

1418. Colpodium parviflorum Boiss. & Buhse

Synonyms: Catabrosella parviflora (Boiss. & Buhse) E.B. Alexeev ex R.R. Mill



Phytogeographical element: I-T

Habitat: Wet placeas, roadsides, ruderal habitats, salty

praces

Elevational range: 1900 - 2600 Flowering period: V - VII

Remarks: Cryptophyte; plant 10–30 cm tall; panicle loose, open, 6–12 cm with glabrous and smooth branches;

lemma obtuse at the apex.

570

Poaceae

1419. Crypsis schoenoides (L.) Lam.



Phytogeographical element: I-T, M, E-S, Americ

Habitat: Fields, salt marshes Elevational range: 500 - 1500 Flowering period: VII - IX

Remarks: Therophyte; plant 5–20 cm high; inflorescence longer than wide; blade of uppermost leaf clearly demarcated from its sheath; palea 2-veined; stamens 3.

1420. Cynodon dactylon (L.) Pers.



Phytogeographical element: Plurireg

Habitat: Ruderal, fields Elevational range: 350 - 2000 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 8–40 cm high; rhizomatous or stoloniferous, sometimes sward forming; inflorescence digitate or sometimes 2 or more closely spaced whorls;

anthers more than 1 mm.

Usefulness: For.

1421. Dactylis glomerata L.



Phytogeographical element: Plurireg Habitat: Meadows, thermophilous shrubs

Elevational range: 900 - 2800 Flowering period: V - VII

Remarks: Cryptophyte; plant 20–120 cm high; spikelets 6–7(–10) mm with 3–4 flowers; lower glume 6–6.5 mm.

















1422. Deschampsia cespitosa (L.) P. Beauv.



Phytogeographical element: Plurireg

Habitat: Riverside forests, alpine meadows, fens and mires

Elevational range: 1850 - 3250 Flowering period: VII - VIII

Remarks: Cryptophyte; plant up to 80 cm high; panicle lax and open, or contracted but not spikelike, 6–30 cm, narrowly oblong to ovate, awn hidden in spikelet, spikelets 4–5 mm long with 2–3 florets.

Usefulness: For.

1423. Deschampsia koelerioides Regel



Phytogeographical element: I-T

Habitat: Alpine meadows, alpine pastures

Elevational range: 1850 - 2850 Flowering period: VII - VIII

Remarks: Cryptophyte; plant up to 80 cm high; panicle dense, spikelike, 1–7 cm, ovate to oblong, brownish

purple with yellowish sheen.

Usefulness: For.

1424. Digitaria sanguinalis (L.) Scop.

Synonyms: Dactylon sanguinale (L.) Vill., Milium sanguinale (L.) Roxb., Paspalum sanguinale (L.) Lam.



Phytogeographical element: A, Plurireg

Habitat: Ruderal, fields Elevational range: 500 - 1200 Flowering period: VI - VIII

Remarks: Therophyte; plant 10–80 cm high; leaf sheaths pilose; inflorescence digitate or subdigitate, axis 1–2 cm;

racemes 4-12, stiff, 5-18 cm; spikelets paired.

572

Poaceae

1425. Echinochloa colona (L.) Link

Synonyms: Panicum crus-galli L. subsp. colonum (L.) Makino & Nemoto



Phytogeographical element: A, Plurireg

Habitat: Ruderal, fields Elevational range: 500 - 1200 Flowering period: V - VII

Remarks: Therophyte; plant up to 60 cm; inflorescence narrow, 5–10 cm; racemes 1–2 cm, erect or sometimes stiffly diverging, simple; spikelets plumply ovate-oblong,

2–3 mm.

1426. Eleusine indica (L.) Gaertn.



Phytogeographical element: A, Plurireg

Habitat: Ruderal, fields Elevational range: 500 - 1100 Flowering period: V - VI

Remarks: Cryptophyte; plant tufted, 10–50 cm high; inflorescence digitate; spikelets 3–9-flowered, 4.6–7.8 mm long; lower glume 1.1–3.9 mm long; upper glume 1.8–4.7 mm long; lemmas lanceolate, 2.4–4.8 mm long.

1427. Elymus sibiricus L.

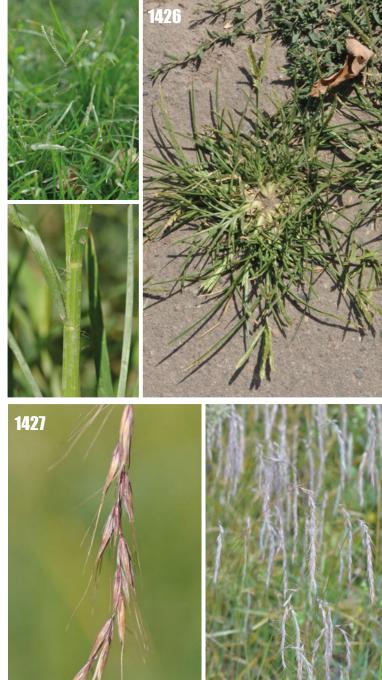


Phytogeographical element: I-T, E-S

Habitat: Steppes, thermophilous shrubs, semi deserts

Elevational range: 500 - 2400 Flowering period: V - VI

Remarks: Cryptophyte; plant 60–90 cm tall. Leaf sheath glabrous; spike pendulous, lax, 15–20 cm; rachis margin scabrous, ciliolate; glumes narrowly lanceolate, 4–5 mm; lemma lanceolate, scabrous or puberulent; first lemma 8–11 mm; awn 15–20 mm.









1428. Elymus transhyrcanus (Nevski) **Tzvelev**

Synonyms: Agropyron leptourum (Nevski) Grossh., Roegneria leptoura Nevski



Phytogeographical element: I-T

Habitat: Steppes, thermophilous shrubs

Elevational range: 1600 - 2400 Flowering period: V - VI

Remarks: Cryptophyte; plant tufted, up to 90 cm high; glumes slightly shorter than the lowest flower in spikelet;

lemma glabrous with 2-5 mm long awn.

1429. Enneapogon persicus Boiss.



Phytogeographical element: I-T

Habitat: River beds, semi-deserts, steppes, thermophilous shrubs

Elevational range: 450 - 1350 Flowering period: V - VI

Remarks: Cryptophyte; plant 15-30 cm high; panicle contracted; glumes sparsely hairy, the lower 5.5-10 mm long, the upper 7-11.5 mm long; fertile lemma with awns

10-13 mm long.

1430. Eragrostis cilianensis (All.) Vign.-Lut. ex Janch.

Synonyms: Eragrostis megastachya (Koel.) Link



Phytogeographical element: Plurireg Habitat: Fields, roads, meadows, steppes

Elevational range: 600 - 1500

Flowering period: V - VII

Remarks: Therophyte; plant 10-25 cm high, glandular on the culms, leaf sheaths, and panicle; spikelets 2-3 mm

broad, lower lemma 2.2-2.8 mm.

574

Poaceae

1431. Eragrostis minor Host.



Phytogeographical element: Plurireg

Habitat: Ruderal habitats Elevational range: 400 - 2200 Flowering period: V - VII

Remarks: Therophyte; plant (5–)15–50 cm high; leaf sheaths usually shorter than internodes, with long silky

hairs, along veins glandular.

1432. Eragrostis pilosa (L.) P. Beauv.



Phytogeographical element: I-T, E-S, Orient, Amer

Habitat: River beds, ruderal, fields Elevational range: 650 - 1800 Flowering period: VI - X

Remarks: Therophyte; plant 10–40 cm high; spikelets linear, 0.7–1.2 mm wide; lower glume 1.5–2 times shorter

linear, 0.7–1.2 mm wide; lower glume 1.5–2 times shorte then the upper.

Usefulness: For.

1433. Eragrostis virescens J. Presl

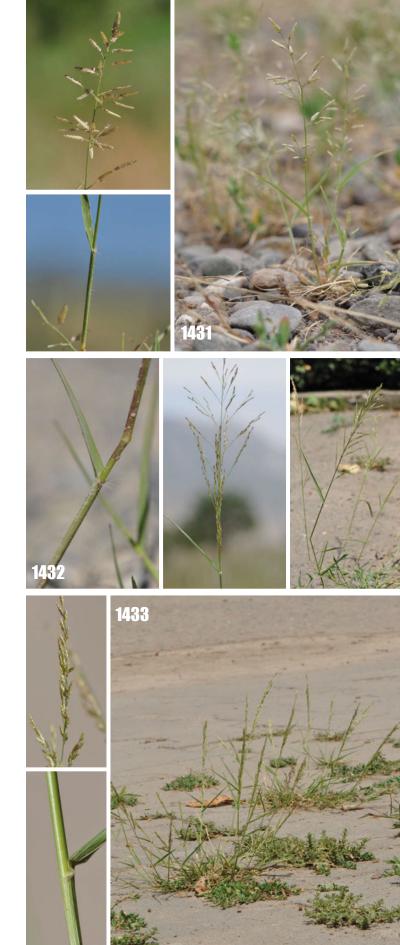


Phytogeographical element: A, Plurireg

Habitat: Ruderal habitats Elevational range: 900 - 2100 Flowering period: V - VII

Remarks: Therophyte; plant 20–50 cm; inflorescence branches glabrous, pedicels shorter than their spikelets;

spikelets pale green to yellowish.







1434. Eremopoa persica (Trin.) Roshev.

Synonyms: Eremopoa oxyglumis Roshev.



Phytogeographical element: SE, EI-T Habitat: Loose sandy screes, screes, steppes

Elevational range: 500 - 3000 Flowering period: V - VII

Remarks: Therophyte; plant 10-40 cm high; lemma usually obtuse at the tip, sometimes abruptly acute or very shortly acuminate; anthers 1.4–2.5 mm long.

1435. Eremopyrum bonaepartis (Spreng.) Nevski



Phytogeographical element: I-T, M Habitat: Deserts, steppes, forbs Elevational range: 450 - 1250 Flowering period: IV - V

Remarks: Therophyte; plant 5–30 cm high; spikelets glabrous or scabrous, 12-15 mm; leaf sheath not inflated on upper leaves, or slightly dilated on uppermost leaf.

Usefulness: For.

1436. Eremopyrum distans (K. Koch) Nevski



Phytogeographical element: I-T Habitat: Semi-deserts, salt marshes Elevational range: 350 - 1950 Flowering period: IV - V

Remarks: Therophyte; plant 5–25 cm high; spikelets villous or hairy, 13–17 mm; glumes linear; lemma long villous; palea keels prolonged into 2 awned teeth 0.5-1.5 mm; leaf sheath slightly dilated but not inflated on uppermost leaf.

Usefulness: For.

1437. Eremopyrum triticeum (Gaertn.) Nevski

Synonyms: Agropyron prostratum P. Beauv.



Phytogeographical element: I-T, M, E-S Habitat: Semi-deserts, salt marshes Elevational range: 400 - 600 Flowering period: IV - V

Remarks: Therophyte; plant 5–20 cm high; spikelets glabrous or scabrous, 6–10 mm; leaf sheath inflated on

upper leaves. Usefulness: For.

1438. Festuca karatavica (Bunge) B. Fedtsch.

Synonyms: Poa karatavica Bunge, Leucopoa karatavica (Bunge) V. Krecz. & Bobr.



Phytogeographical element: SE, I-T

Habitat: Alpine steppes Elevational range: 2000 - 3700

Flowering period: VII

Remarks: Cryptophyte; plant 50–100 cm high; panicle 7–12 cm long, with many (up to 100) spikelets; branches smooth.

Usefulness: For.

1439. Festuca olgae (Regel) Krivot.

Synonyms: Leucopoa olgae (Regel) Krecz. & Bobrov



Phytogeographical element: I-T Habitat: Alpine swards, screes Elevational range: 3200 - 4600 Flowering period: VI - VII

Remarks: Cryptophyte; plant tufted, 25–80 cm hogh; shoots intravaginal, basal sheaths straw–colored, glossy, not splitting into fibers; leaf sheaths glabrous; panicle loose, branches 3–7 cm, smooth; spikelets 7–11 mm, purplish; anthers 2.7–4 mm; ovary apex densely hairy.



















1440. Festuca pratensis Huds.



Phytogeographical element: Plurireg Habitat: Meadows, ruderal habitats Elevational range: 900 - 2200 Flowering period: V - VI

Remarks: Cryptophyte; plant 30–100 cm high; leaf sheaths glabrous; auricles falcate, glabrous; panicle compact except at anthesis, (6–)10–25 cm; spikelets 8.5–17 mm; glumes glabrous or scabrid; lemmas (5–)6–8 mm, smooth or scabrid, apex hyaline, acute, rarely awn-tipped; awns 0–2 mm.

1441. Festuca valesiaca Schleich, ex Gaudin



Phytogeographical element: I-T Habitat: Juniper forests, steppes Elevational range: 700 - 1900 Flowering period: V - VII

Remarks: Cryptophyte; plant densely tufted, 20–40 cm high; leaf blades filiform, green or bluish.

1442. Glyceria notata Chevallier

Synonyms: *Glyceria plicata* (Fries) Fries, *G. turcomanica* Komarov.



Phytogeographical element: Plurireg

Habitat: Littoral vegetation, aquatic vegetation, water

bodies

Elevational range: 550 - 2500 Flowering period: V - VIII

Remarks: Cryptophyte; plant 30–100 cm high; leaf sheaths keeled, scabrid in upper part; leaf blades 6–30 cm \times 4–10 mm, apex acute; ligule 3–6 mm; panicle up to 30 cm; spikelets cylindrical 1–2.5 cm, lower glume 1.4–2.3 mm with obtuse tip at the apex.

578

1443. Henrardia persica (Boiss.) C.E. Hubb.



Phytogeographical element: I-T

Habitat: Meadows, steppes, thermophilous shrubs, forbs

Elevational range: 750 - 1750 Flowering period: IV - VI

Remarks: Therophyte; plant up to 30 cm high; spikelets 7–10 mm long; glumes rigid, pubescent or glabrous.

1444. Heteranthelium piliferum (Sol.) Hochst. ex Jaub. & Spach



Phytogeographical element: I-T, M

Habitat: Steppes

Elevational range: 650 - 2000 Flowering period: IV - VI

Remarks: Therophyte; plants tufted, 10-30 cm high; glumes 2.5-5 mm long, hairy on the back, with up to

11 mm long awn.

1445. Hordeum brevisubulatum (Trin.) Link



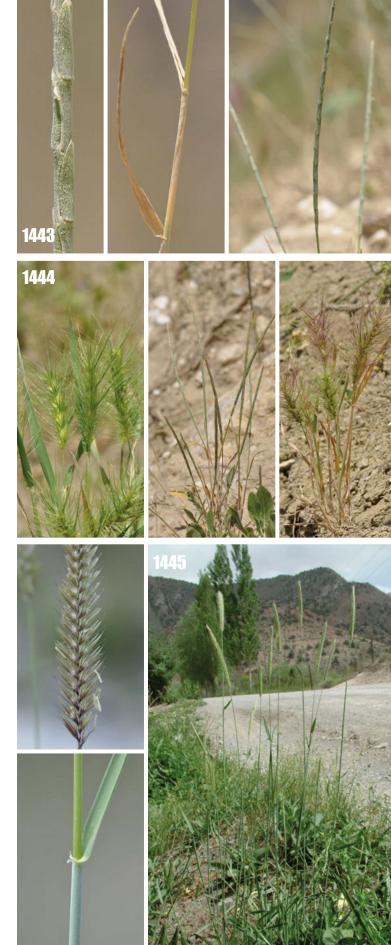
Phytogeographical element: I-T, E-S

Habitat: Meadows, fens and mires, salt marshes

Elevational range: 900 - 3800 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 30-80 cm high; lemma of central spikelet grinish, glabrous or subglabrous; culms

glabrous throughot. Usefulness: For.





1446. Hordeum bulbosum L.



Phytogeographical element: I-T, M Habitat: Meadows, steppes Elevational range: 2600 - 2700 Flowering period: V - VI

Remarks: Cryptophyte; plants 50–150 cm high, with bulbous culm base; lemma with awn 1.2–3.6 mm.

Usefulness: For.

1447. Hordeum distichon L.



Phytogeographical element: Cultivated Habitat: Roadsides, arable fields Elevational range: 400 - 2400

Flowering period: V - VI

Remarks: Therophyte; plant 50–100 cm high; lateral spikelets sterile; spikes with 2 longitudinal rows of fertile

spikelets.

1448. Hordeum leporinum Link

Synonyms: *Hordeum murinum* L. subsp. *leporinum* (Link) Arcang.



Phytogeographical element: M, I-T

Habitat: Ruderal

Elevational range: 400 - 1700 Flowering period: IV - VII

Remarks: Therophyte; plant 5–35 cm high; glumes of the middle spikelet ciliate at margins, palea of central spikelet 0.7–0.9 times as long as palea of lateral spikelet; central spikelet with a pedicel 0.9–1.8 mm long; lateral spikelets

longer than the central.

1449. Hordeum turkestanicum Nevski



Phytogeographical element: EI-T

Habitat: Meadows, fens and mires, steppes

Elevational range: 2500 - 4200 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 20-60 cm high; lemma of central spikelet densely pinkish violet, pilose or long

Usefulness: For.

1450. Imperata cylindrica (L.) Raeusch.



Phytogeographical element: I-T, M Habitat: River beds, riverside forests Elevational range: 350 - 1600 Flowering period: V - VI

Remarks: Cryptophyte; plant 20-125 cm high; leaf blades

0.2-2 cm wide; panicle 6-20 cm.

Usefulness: For.

1451. Koeleria macrantha (Ledeb.) Schult.



Phytogeographical element: Plurireg

Habitat: River beds, semi-deserts, steppes, thermophilous

Elevational range: 1500 - 2800 Flowering period: VI - VII

Remarks: Cryptophyte; plant 5–60 cm high; woolly especially below panicle, 2-3-noded; leaf sheaths glabrous or pubescent; leaf blades grayish green, usually rolled, sometimes flat; panicle linear-oblong in outline, 1.5-13 cm, lower part often interrupted and lobed, silvery green or tinged purple; axis and branches woolly.







1452. Leymus lanatus (Korsh.) Tzvelev

Synonyms: Elymus lanatus Korsh., Malacurus lanatus (Korsh.) Nevski



Phytogeographical element: E, EI-T Habitat: Loose sandy screes, screes Elevational range: 3600 - 4000 Flowering period: VII - VIII

Remarks: Cryptophyte; plant tufted, 50–120 cm high; spike dense, 6–13 cm; lemma 7–10 mm, densely pubescent.

1453. Leymus secalinus (Georgi) Tzvelev

Synonyms: Elymus dasystachys Trin., Leymus dasystachys (Trin.) Pilg.



Phytogeographical element: EI-T

Habitat: Deserts, salt marshes, alpine steppes

Elevational range: 3000 - 4100 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 18–100 cm high, glumes

shorter than spikelet, lemma pubescent.

Usefulness: For.

1454. Loliolum subulatum (Banks & Sol.) Eig



Phytogeographical element: I-T

Habitat: Steppes, thermophilous shrubs

Elevational range: 600 - 1000 Flowering period: IV - V

Remarks: Therophyte; plant 5–15 cm high, inflorescence a stiff one-sided spike. Spikelets 3–6(–9)-flowered, laterally

compressed.

582

1455. Lolium multiflorum Lam.



Phytogeographical element: Plurireg Habitat: Anthropogenic sides, meadows

Elevational range: 500 - 1200 Flowering period: V - VII

Remarks: Therophyte; plant 30–130 cm high; spikelets 8–30 mm long (excluding the awns), 11–22-flowered; upper glume 5–14(–18) mm long, 0.25–0.5 times the length of the spikelet, not much longer than the lowest

floret; lemmas awned.

1456. Lolium perenne L.



Phytogeographical element: Plurireg

Habitat: Roadsides

Elevational range: 500 - 2400 Flowering period: V - IX

Remarks: Therophyte; plant 10–90 cm high, with non-flowering shoots at anthesis; spikelets 2–10(–14)-flowered; leaf–blades flat or folded when

young, lemmas usually awnless.

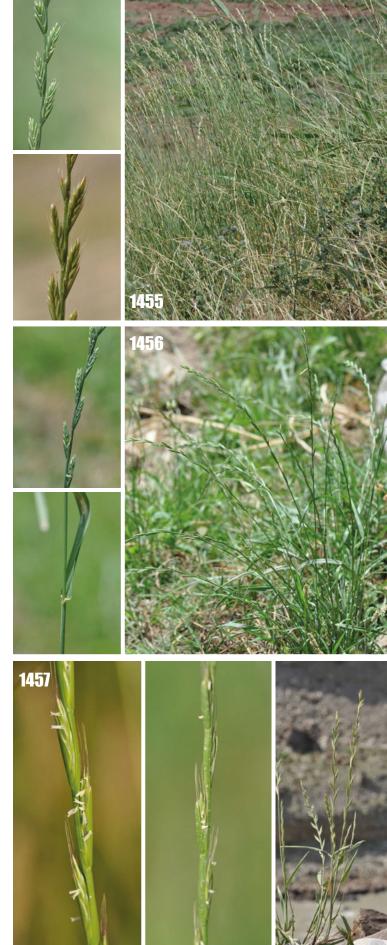
1457. Lolium persicum Boiss. & Hohen.



Phytogeographical element: M, I-T, E-S Habitat: Fields, roadsides, meadows Elevational range: 1000 - 2400

Flowering period: V - VII
Remarks: Therophyte: plant 15

Remarks: Therophyte; plant 15–90 cm high; spikelets 3–11-flowered; upper glume (5–)7.5–23 mm long, two thirds to as long as the spikelet, lemmas awned.









1458. Lolium temulentum L.

Synonyms: Lolium cuneatum Nevski, Lolium temulentum subsp. cuneatum (Nevski) Tzvelev



Phytogeographical element: I-T

Habitat: Meadows, pastures, fields, steppes

Elevational range: 350 - 1700 Flowering period: V - VI

Remarks: Therophyte; plant 25–80 cm high; lower glume eliptic-lanceolate, 6–7 mm long; mature caryopsis not

more than 3 times as long as wide.

Usefulness: For.

1459. Melica altissima L



Phytogeographical element: M, I-T, E-S Habitat: Forest sides, shrubs, screes Elevational range: 1500 - 2000 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 60–150 cm high; panicle linear-oblong, very dense and with many crowded spikelets, 10–20 cm, 1-sided; branches erect, appressed to main axis, up to 5 cm; spikelets broadly elliptic to oboyate, 10–14 mm.

obovate, 10–14 mm.

1460. Melica jacquemontii Decne. var. canescens (Regel)M. Nobis & A. Nowak

Synonyms: Melica canescens (Regel) Lavr., Melica persica Kunth, Melica jacquemontii subsp. canescens (Regel) Bor



Phytogeographical element: I-T

Habitat: Screes

Elevational range: 2000 - 2800 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 20–60 cm high; the subspecies is similar to *Melica jacquemontii* var. *jacquemontii*, but it has sheaths of the cauline leaves pubescent not glabrous.

1461. Melica persica Kunth subsp. inaequiglumis (Boiss.) Bor

Synonyms: *Melica inaequiglumis* Boiss., *Melica persica* var. *inaequiglumis* (Boiss.) W. Hempel



Phytogeographical element: I-T Habitat: Screes, steppes Elevational range: 1400 - 2700 Flowering period: IV - VI

Remarks: Cryptophyte; plant 20–60 cm high; upper glume (7–)8–10 mm and 2–3 times longer than the lower.

1462. Melica secunda Regel



Phytogeographical element: I-T, E-S

Habitat: Rocks, screes

Elevational range: 1100 - 2500 Flowering period: VI - VIII

Remarks: Cryptophyte; plant tufted, panicle linear in outline, lax, usually 1-sided, 10–18 cm; lemmas

scaberulous.

1463. Neotrinia splendens (Trin.)M. Nobis, P.D. Gudkova & A. Nowak

Synonyms: Stipa splendens Trin., Achnatherum splendens (Trin.) Nevski



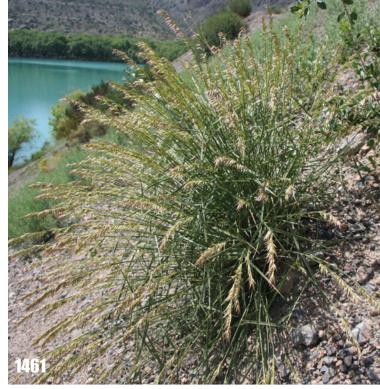
Phytogeographical element: I-T, C-A, E-S

Habitat: Alpine semi-deserts, alpine steppes, meadows

Elevational range: 1500 - 3900 Flowering period: VI - VIII

Remarks: Cryptophyte; plant densely tufted, 80–250 cm high; glumes unequal; lemma apex with two lobes, awn

6–12 mm.













1464. Oryza sativa L.



Phytogeographical element: Cultivated

Habitat: Cultivated in fields Elevational range: 400 - 2000 Flowering period: VII - VIII

Remarks: Therophyte; plant 40–150 cm high, sterile lemmas oblong or narrowly ovate; spikelets ovate, persistent; fertile lemma awn-less or with a very long flexuous awn; ligule of lower leaves membranous, acute,

15-45 mm.

1465. Paspalum distichum L.

Synonyms: Paspalum digitaria Poir.



Phytogeographical element: Plurireg

Habitat: Wet places, meadows, diches, roadsides

Elevational range: 400 - 900 Flowering period: VII - IX

Remarks: Cryptophyte; plant with rhizomes and stolons, 20–50 cm high; leaf sheaths margins ciliate; ligule 2–3 mm; inflorescence of 2(–3) racemes arising together or separated by a short axis; spikelets single, in 2 rows; lower glume up to 1/2 spikelet length or more; upper glume with distinct middle vein, loosely appressed pubescent.

1466. Pennisetum orientale L.C. Rich.



Phytogeographical element: S-A, I-T

Habitat: Riversides

Elevational range: 800 - 1500 Flowering period: VII - IX

Remarks: Cryptophyte; plant 60–130 cm high; panicle linear, 8–30 cm long, often interrupted; rachis with 0.5–1.5 mm long hairs, enclosing 1–3(–5) spikelets.

586

1467. Phalaris arundinacea L.

Synonyms: Digraphis arundinacea (L.) Trin.



Phytogeographical element: I-T, E-S

Habitat: Riversides

Elevational range: 500 - 1000 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 0.6–1.5 m high, with spreading rhizomes; panicle contracted, linear-oblong in outline, 8–15 cm; branches short; spikelets oblong, laterally compressed, 4–6 mm; glumes not or very

narrowly winged.

1468. Phleum alpinum L.



Phytogeographical element: Plurireg Habitat: Meadows, fens and mires Elevational range: 2600 - 4200 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 5–40 cm high; panicle broadly cylindrical or ovoid; glumes with 1.5–3 mm awns;

spikelets purplish. Usefulness: For.

1469. Phleum paniculatum Huds.



Phytogeographical element: I-T, M, E-S

Habitat: River beds, meadows, thermophilous shrubs

Elevational range: 600 - 2000 Flowering period: IV - VI

Remarks: Cryptophyte; plant 5–30 cm high; panicle up to 12 cm long, 3.5–7 mm wide, cylindrical; glumes truncate,

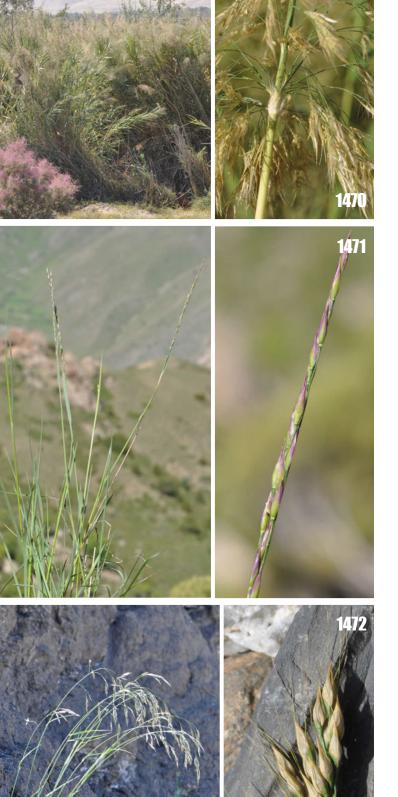
swollen at the tip; awn 0.3-0.6 mm long.

Usefulness: For.









1470. Phragmites australis (Cav.) Trin. ex Steud.



Phytogeographical element: Plurireg

Habitat: Littoral vegetation Elevational range: 350 - 4150 Flowering period: VII - IX

Remarks: Cryptophyte; plant 1–4 m high; lemma glabrous,

hairs originating from tally elongated callus.

Usefulness: For.

1471. Piptatherum alpestre (Grig.) Roshev.



Phytogeographical element: SE, I-T

Habitat: Alpine meadows, steppes, xeric shrubs, forbs

Elevational range: 2300 - 3900

Flowering period: VII

Remarks: Cryptophyte; plant 15–50 cm high; lemma 3.2–4.2 mm long, anthers 1.5–1.8 mm long, awn 1.5–3.5 mm

long.

Usefulness: For.

1472. Piptatherum latifolium Roshev.



Phytogeographical element: I-T

Habitat: Alpine meadows, steppes, xeric shrubs, forbs

Elevational range: 1100 - 2200 Flowering period: V - VII

Remarks: Cryptophyte; plant 50–100 cm high; panicle lax; lemma pilose, 1.8–2.2 mm wide; culm leaves 6–13 mm

wide.

1473. Piptatherum microcarpum (Pilg.) Tzvelev

Synonyms: Piptatherum vicarium Grig



Phytogeographical element: I-T

Habitat: Alpine meadows, steppes, xeric shrubs, rocks

Elevational range: 900 - 2600 Flowering period: V - VII

Remarks: Cryptophyte; plant 40–90 cm high; panicle lax, lemma glabrous, 2.8–3.5 mm long; awn 2.5–4 mm long.

1474. Piptatherum pamiralaicum (Grig.) Roshev.



Phytogeographical element: E, I-T

Habitat: Screes, alpine steppes, xeric shrubs

Elevational range: 2600 - 4150 Flowering period: VI - VII

Remarks: Cryptophyte; plant 20–50 cm high; spikelets 4.5–7 mm long, lemma obovate, 2.5–3.5 mm long;

covered with densely appressed hairs.

1475. Piptatherum platyanthum Nevski



Phytogeographical element: E, I-T

Habitat: Alpine semi-deserts, alpine steppes

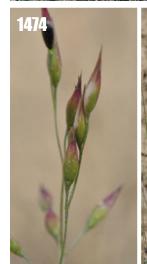
Elevational range: 2450 - 4300 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 15–35 cm high; lemma 1.5–2 mm wide, elliptic to ovate-elliptic, covered with appressed hairs but ascending in its apical part.



















1476. Piptatherum songaricum (Trin. & Rupr.) Roshev.

Synonyms: *Piptatherum kokanicum* (Regel) Nevski, *Piptatherum tianschanicum* (Drobow & Vved.) Roshev. ex V.A. Nikitin.



Phytogeographical element: I-T

Habitat: Juniper forests, meadows, xeric shrubs

Elevational range: 1900 - 3300 Flowering period: V-VII

Remarks: Cryptophyte; plant 40–60 cm high; panicle lax, glumes 6–9 mm long, lemma 4–5 mm long shortly acute,

awn 5–8 mm. Usefulness: For.

1477. Poa alpina L.



Phytogeographical element: Plurireg

Habitat: Alpine meadows, fens and mires, pastures

Elevational range: 2700 - 3700 Flowering period: VII - IX

Remarks: Cryptophyte; plant 5-30 cm high; palea keels

usually scabrid; panicle branches smooth.

Usefulness: For.

1478. Poa bulbosa L.



Phytogeographical element: Plurireg

Habitat: Meadows, steppes Elevational range: 350 - 3000 Flowering period: III - VII

Remarks: Cryptophyte; plant 10–25 cm high; culms with bulbous bases due to basally swollen sheaths; spikelets

often viviparous. Usefulness: For.

590

1479. Poa lipskyi Roshev.

Synonyms: Poa contracta Ovcz. & Czuk., Poa pseudodisjecta Ovcz.



Phytogeographical element: I-T

Habitat: Pastures, screes, alpine semi-deserts, moraines

and snow-beds

Elevational range: 3500 - 4800 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 20–50 cm; leaves flat, 2–3 mm wide; spikelets 7–10 mm long; with 3–6 florets.

Usefulness: For.

1480. Poa nemoralis L.



Phytogeographical element: Plurireg Habitat: Screes, steppes, forests Elevational range: 1300 - 2600 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 30–70 cm high; leaf sheaths smooth or scabrid, shorter than blade; spikelets

lanceolate, 3.5–5(–6) mm, florets mostly 3.

1481. Poa pratensis L.



Phytogeographical element: Plurireg

Habitat: Broad-leaved forests, meadows, steppes,

thermophilous shrubs, forbs Elevational range: 800 - 3600 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 20–60 cm high; ligules of cauline leaves short, up to 2 mm long, truncate.

Usefulness: For.

















1482. Poa relaxa Ovcz.

Synonyms: *Poa versicolor* Besser. subsp. *relaxa* (Ovcz.) Tzvelev



Phytogeographical element: I-T Habitat: Rocks, screes Elevational range: 1200 - 3900 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 25–60 cm high, culms purple at the bottom; panicle 9–12 cm; lemma with visable vains.

1483. Poa supina Schrad.



Phytogeographical element: I-T, E-S, M

Habitat: Alpine meadows, fens and mires, pastures

Elevational range: 1100 - 3500 Flowering period: V - VII

Remarks: Cryptophyte; plant 4–20 cm high, perennial; palea keels shortly villous, smooth; lemmas glabrous between veins; anthers (1.2–)1.5–1.8 (–2.5) mm.

1484. Polypogon fugax Nees ex Steud.

Synonyms: Polypogon demissus Steud.



Phytogeographical element: I-T, I-I, Orient

Habitat: Meadows, fields, salt marshes, littoral vegetation

Elevational range: 600 - 2100 Flowering period: V - VII

Remarks: Therophyte; plant 10–50 cm; glumes with awns up to 2 times as long as glume body; lemma with awn

1.5–2 times longer than lemma.

Usefulness: For.

1485. Polypogon monspeliensis (L.) Desf.



Phytogeographical element: Plurireg

Habitat: Meadows, pastures, river sides, diches

Elevational range: 800 - 240 Flowering period: V - VII

Remarks: Therophyte; plant 10–50 cm; glumes with awns 2.5–4 times as long as glume body; lemma with 1.5–2 mm

awn

1486. Psathyrostachys juncea (Fisch.) Nevski



Phytogeographical element: I-T Habitat: Screes, steppes Elevational range: 2000 - 2400 Flowering period: V - VII

Remarks: Cryptophyte; plant densely tufted, 40–100 cm high; spikelets ovate 0.8–1 cm, with 2–3 florets; glumes 8–10 mm, scabrous; lemma 6–12 mm, scabrous; awn

2-3.5 mm.

1487. Psathyrostachys kronenburgii (Hack.) Nevski



Phytogeographical element: EI-T, E-S

Habitat: Alpine steppes Elevational range: 2700 - 3700 Flowering period: VI - VIII

Remarks: Cryptophyte; plant densely tufted, 30–90 cm high; spikelets narrowly ovate 0.8–1 cm, with 1–2 florets; glumes violet tinged 8–10 mm, pilose; lemma 6–12 mm \times

5-veined, pilose, awn 2-3.5 mm.



















1488. Psilurus incurvus (Gouan) Schinz & Thell.

Synonyms: Psilurus aristatus (L.) Duval-Jouve



Phytogeographical element: M, I-T

Habitat: Salty places Elevational range: 500 - 900 Flowering period: IV - VI

Remarks: Cryptophyte; plant 10–30 cm high; spikelets with 1 fertile floret, laterally compressed, sessile; terminal spikelet with 2 small 1-nerved glumes, the lower glume

absent in the other spikelets.

1489. Ptilagrostis malyschevii Tzvelev



Phytogeographical element: SE, EI-T

Habitat: Alpine swards Elevational range: 3000 - 3800 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 30–60 cm tall, densely tufted; panicle open; lemma 4–6 mm, pilose below middle, scabrid above; awn 1.5–3 cm, weakly geniculate, column slightly flexuous, plumose, hairs 1.2–1.5 mm; palea equal to lemma; anthers 1.8–3 mm, pilose at apex.

1490. Puccinellia distans (Jacq.) Parl.

Synonyms: Puccinellia glauca (Regel) Krecz. ex Drobov



Phytogeographical element: Plurireg

Habitat: Alpine semi-deserts, salt marshes, roadsides

Elevational range: 500 - 3000 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 10–60 cm high; lgule 1–2 mm, truncate or toothed; panicle open; lemmas 1.8–2.2 mm, base pubescent, apex truncate or rounded;

palea keels scabrid; anthers 0.5-0.8 mm.

1491. Puccinellia hackeliana (Krecz.) Krecz. ex Drobov



Phytogeographical element: EI-T

Habitat: Alpine semi-deserts, salt marshes

Elevational range: 2600 - 4200 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 10-30 cm high; ligule 1-2.5 mm; panicle 5-15 cm; lemmas 2.5-3 mm, base pubescent, apex triangular-rounded; palea keels pubescent in lower part, scabrid in upper part; anthers 0.7–1 mm.

1492. Puccinellia humilis Lity. ex V. Krecz.



Phytogeographical element: EI-T

Habitat: Alpine semi-deserts, salt marshes

Elevational range: 3800 - 4750 Flowering period: VII - VIII

Remarks: Cryptophyte; plants tufted, 5-20 cm high; spikelets 6–7 mm, lower glume ca. 2.2 mm, upper glume 2.5–3 mm; lemmas 2.5–3.5 mm, violet, base shortly hairy, apex subobtuse; palea keels scabrid on upper part; anthers 0.7-1.2 mm.

1493. Puccinellia pamirica (Roshev.) Krecz. ex Ovcz. & Czukav.

Synonyms: Puccinellia akbaitalensis Ovcz. & Czuk.



Phytogeographical element: E, EI-T

Habitat: Alpine semi-deserts, salt marshes

Elevational range: 2800 - 4200 Flowering period: VII - VIII

Remarks: Cryptophyte; plants 5-30 cm high; panicle mostly contracted, or spreading after anthesis, 5–10 cm long; spikelets 4–5 mm, purple tinged, lemmas 2.5–3.5 mm, glabrous, with a raised keel, margins membranous, apex acute or acuminate, finely toothed; palea keels smooth or sparsely scabrid; anthers 1.3-1.8 mm.

Usefulness: For.

















1494. Puccinellia schischkinii Tzvelev



Phytogeographical element: I-T

Habitat: Alpine semi-deserts, salt marshes, roadsides

Elevational range: 2800 - 3800 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 20–40 cm tall, 1–2 mm in diameter; ligule 1–2 mm, rounded or acuminate; lemmas 2.2–3.2 mm, apex acute; palea keels ciliate on lower part,

scabrous on upper part; anthers 0.7–1.2 mm.

1495. Rostraria cristata (L.) Tzvelev

Synonyms: Lophochloa cristata (L.) Hyl., Trisetaria cristata (L.) Kerguélen



Phytogeographical element: M, I-T, C-A Habitat: Meadows, pastures, fields, steppes

Elevational range: 400 - 2000 Flowering period: V - VII

Remarks: Cryptophyte; plant 10–60 cm high, tufted; panicle cylindrical and dense or pyramidal, lax and +/-lobed, 1–12 cm long; spikelets 3–6(–10)-flowered; glumes glabrous 2–3 mm long; lemma elliptic, 25–35 mm.

1496. Saccharum ravennae (L.) L.

Synonyms: Andropogon ravennae L.



Phytogeographical element: I-T, M Habitat: River beds, riverside forests Elevational range: 350 - 1800

Flowering period: VI - VII

Remarks: Cryptophyte; plant 1.5–5 m high; spikelets 3–6 mm, purplish; lower lemma 3/4 as long to subequaling glumes; upper lemma elliptic, with acute apex, awned; awn almost straight, 4–8 mm long.

598

1497. Saccharum spontaneum L.



Phytogeographical element: I-T, I-I Habitat: River beds, riverside forests Elevational range: 350 - 1550 Flowering period: V - VII

Remarks: Cryptophyte; plant rhizomatous, 1–2 m high; leaf blades 2–8 mm wide, narrowed to midrib at base;

spikelet without awn. Usefulness: For.

1498. Schismus arabicus Nees



Phytogeographical element: I-T, M Habitat: Semi-deserts, deserts Elevational range: 350 - 2500 Flowering period: III - VI

Remarks: Therophyte; plant 2–15 cm high; lobes of the lemma narrowly triangular, clearly longer than broad;

hairs of the lemma pointed, never clavate.

Usefulness: For.

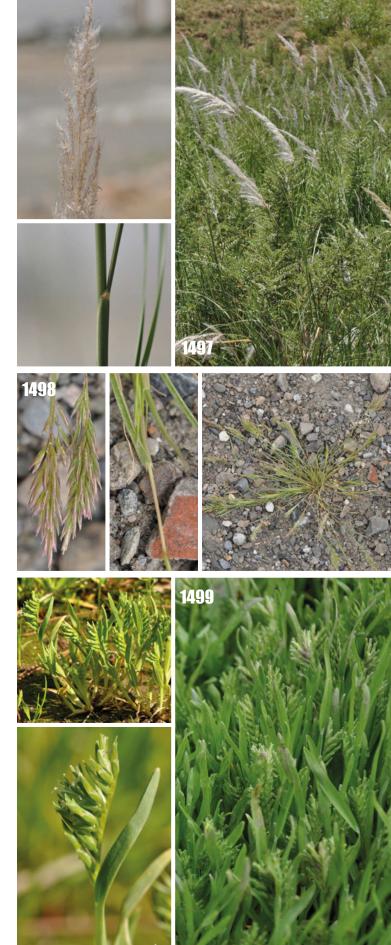
1499. Sclerochloa dura (L.) P. Beauv.



Phytogeographical element: I-T, M Habitat: River beds, ruderal, fields Elevational range: 400 - 1700 Flowering period: III - V

Remarks: Therophyte; plant 5–15 cm high; lower glume 2–3 mm long, upper 3.5–5 mm long; lemmas ovateoblong, lowest 4.8–6 mm, the upper much shorter.

Usefulness: For.













1500. Secale cereale L.



Phytogeographical element: Cultivated

Habitat: Cultivated in fields Elevational range: 350 - 2400 Flowering period: IV - VI

Remarks: Therophyte; plant 60–180 cm high; glumes with very short 1–3 mm long awn; lemmas with 2–5 cm long

awn.

1501. Setaria pumila (Poir.) Roem. & Schult.

Synonyms: Pennisetum glaucum (L.) R. Br., Setaria glauca (L.) P. Beauv.



Phytogeographical element: Plurireg

Habitat: Fields, ruderal Elevational range: 350 - 2600 Flowering period: IV - IX

Remarks: Therophyte; plant 20–90 cm high; each branchlet from the main axis with only one mature spikelet; upper glume up to 1/2 as long as spikelet, upper floret clearly exposed; spikelets (2.2–)2.5–3.5 mm; upper lemma

coarsely rugose.

1502. Setaria verticillata (L.) P. Beauv.



Phytogeographical element: A, Plurireg Habitat: River beds, ruderal, fields Elevational range: 350 - 650 Flowering period: VII

Poaceae

Remarks: Therophyte; plant 20–80 cm high; each branchlet from the main axis with several mature spikelets; upper glume 2/3 as long to equaling spikelet; awn serration directed to the base.

600

1503. Setaria viridis (L.) P. Beauv.



Phytogeographical element: Plurireg Habitat: River beds, ruderal, fields Elevational range: 350 - 2500 Flowering period: VI - VIII

Remarks: Therophyte; plant 20-100 cm high; each branchlet from the main axis with several mature spikelets; upper glume 2/3 as long to equaling spikelet;

awn serration directed to the apex.

Usefulness: For.

1504. Sorghum halepense (L.) Pers.



Phytogeographical element: Plurireg Habitat: Anthropogenic sides, shibliak Elevational range: 500 - 1900

Flowering period: V - VIII

Remarks: Cryptophyte; plant with rhizoms, 50–150 cm tall; panicle 20-40 cm; sessile spikelet elliptic; lower

glume apex clearly 3-denticulate.

1505. Stipa arabica Trin. & Rupr.

Synonyms: Stipa caspia K. Koch, Stipa szovitsiana Trin.

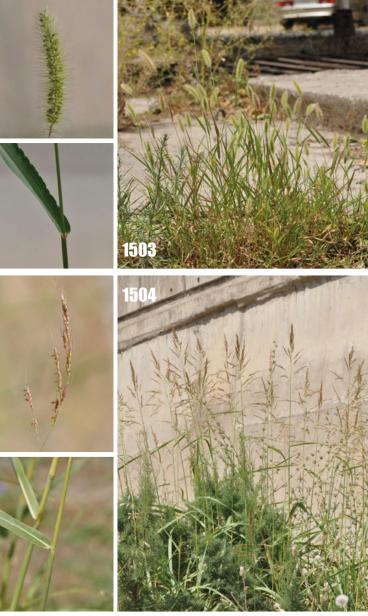


Phytogeographical element: I-T

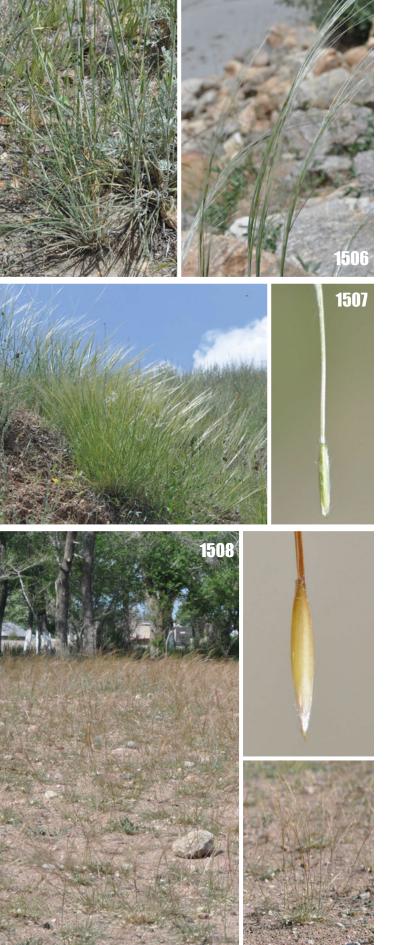
Habitat: Rocks, loose sandy dunes, screes, steppes

Elevational range: 800 - 2800 Flowering period: V - VII

Remarks: Cryptophyte; plant 40-75 cm high; ligules of vegetative leaves over 3-10 mm; awn bigeniculate, 10–17 cm, pilose throughout, with hairs 1.5–3 mm.







1506. Stipa badachschanica Roshev.



Phytogeographical element: I-T Habitat: Screes, steppes Elevational range: 2000 - 2600 Flowering period: V - VII

Remarks: Cryptophyte; plant 40–95 cm high; ligules of vegetative leaves up to 10 mm; lemma with glabrous callus; awn bigeniculate, 14–18 cm, pilose throughout,

with hairs 1.5-3 mm.

1507. Stipa × brevicallosa M. Nobis



Phytogeographical element: E; I-T

Habitat: Steppes

Elevational range: 1300 - 2350 Flowering period: V - VI

Remarks: Cryptophyte; plant 20–35 cm high; anthecium 9–12 mm; callus 0.9–1.4 mm long, base narrow; awn uniceniculate, lower segment scabrous and 3–4 times

shorter than the upper.

1508. Stipa bungeana Trin.



Phytogeographical element: EI-T

Habitat: Alpine semi-deserts, alpine steppes

Elevational range: 1500 - 2000 Flowering period: V - VII

Remarks: Cryptophyte; plant 20–60 cm high; ligules of vegetative leaves over 0.2–0.5 mm; glumes 9–15 mm; anthecium 5–7 mm; awn bigeniculate, scabrous.

1509. Stipa capillata L.



Phytogeographical element: I-T, E-S, M

Habitat: Steppes, xeric shrubs Elevational range: 1600 - 3100 Flowering period: VI

Remarks: Cryptophyte; plants tufted, 40–100 cm high; leaves long pilose at the adaxial surface; lemma apex

glabrous, awn with 2 geniculations, scabrous.

Usefulness: For.

1510. Stipa caucasica Schmalh.



Phytogeographical element: I-T Habitat: Screes, semi-deserts, steppes Elevational range: 1400 - 4000 Flowering period: V - VII

Remarks: Cryptophyte; plants tufted, 20–60 cm high; leaves very shortly pilose at the upper surface and

glabrous at the lower; glumes > 34 mm; lemma apex with ring of hairs; awn unigeniculate with hairs 0.9–2.5 mm

long on the lower segment.

Usefulness: For.

1511. Stipa caucasica Schmalh. subsp. nikolai M. Nobis, A. Nobis & A. Nowak



Phytogeographical element: I-T Habitat: Rocks, screes Elevational range: 1400 - 2800 Flowering period: V - VII

Remarks: Cryptophyte; plants tufted, 20–40 cm high; leaves very shortly pilose at the upper surface and glabrous at the lower; glumes > 34 mm; lemma apex with ring of hairs; awn unigeniculate with hairs 0.2–0.7 mm

long on the lower segment.

Usefulness: For.











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1512. Stipa drobovii (Tzvelev) Czerep.

Synonyms: Stipa caucasica Schmalh. subsp. drobovii Tzvelev



Phytogeographical element: SE, I-T

Habitat: Screes, steppes Elevational range: 1400 - 2400 Flowering period: V - VII

Remarks: Cryptophyte; plant 15–40 cm high; ligules of vegetative leaves up to 0.2 mm; anthecium 10–12 mm; callus 0.8–1.2 mm with falcate hairs, awn unigeniculate.

1513. Stipa drobovii (Tzvelev) Czerep. var. iskanderkulica (Tzvelev)

M. Nobis & A. Nowak

Synonyms: Stipa iskanderkulica (Tzvelev) Czerep.



Phytogeographical element: I-T Habitat: Screes, steppes Elevational range: 1400 - 2200 Flowering period: V - VII

Remarks: Cryptophyte; Similar to S. drobovii var. drobovii,

but leaves densely pubescent (not glabrous).

1514. Stipa glareosa P.A. Smirn.

Synonyms: Stipa caucasica Schmalh. subsp. glareosa (P.A. Smirn.) Tzvelev



Phytogeographical element: EI-T

Habitat: Alpine semi-deserts, alpine steppes

Elevational range: 3700 - 4200

Flowering period: VII

Remarks: Cryptophyte; plants tufted, 15–40 cm high; leaves very shortly pilose at the upper surface and scabrous on the lower; glumes < 28 mm; lemma apex with ring of hairs; awn unigeniculate.

Usefulness: For.

1515. Stipa gracilis Roshev.



Phytogeographical element: SE, I-T

Habitat: Rocks, screes Elevational range: 2600 - 3200 Flowering period: V - VII

Remarks: Cryptophyte; plant 15–35 cm high; ligules of vegetative leaves up to 4 mm; anthecium 5–7 mm long,

awn bigeniculate, pilose.

1516. Stipa hohenackeriana Trin. & Rupr.



Phytogeographical element: I-T, E-S Habitat: Steppes, xeric shrubs Elevational range: 800 - 2100 Flowering period: IV - VI

Remarks: Cryptophyte; plants tufted, 40–80 cm high; awn bigeniculate; lower part of awn scabrous, middle segment of awn scabrous or with 0.3–1.5 mm long hairs increasing towards the second geniculation, seta with hairs 1.6–2.5 mm.

Usefulness: For.

1517. Stipa kirghisorum P.A. Smirn.



Phytogeographical element: SE, I-T

Habitat: Steppes

Elevational range: 1500 - 2600 Flowering period: V - VI

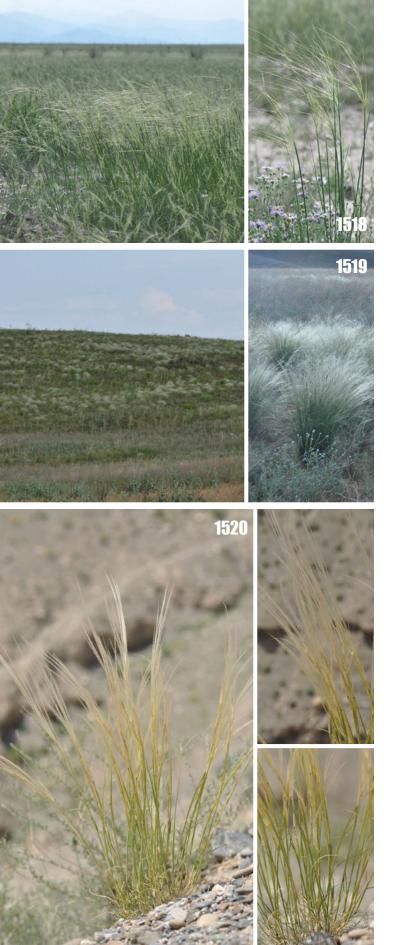
Remarks: Cryptophyte; plant 40–80 cm high, leaves scabrous, with very short hairs at the upper surface; lemma 13–17 mm, glabrous at the apex; awn column

glabrous, seta pilose.









1518. Stipa krylovii Roshev.



Phytogeographical element: EI-T, C-A Habitat: Semi-deserts, steppes Elevational range: 2400 - 3200 Flowering period: V - VI

Remarks: Cryptophyte; plant tufted 30–70 cm high, leaves glabrous, with very short hairs at the upper surface; lemma with well developed ring of hairs at the apex; awn scabrous.

1519. Stipa lessingiana Trin. & Rupr.



Phytogeographical element: I-T, E-S

Habitat: Screes, steppes Elevational range: 1000 - 1500 Flowering period: V - VI

Remarks: Cryptophyte; plant 30–65 cm high; ligules of vegetative leaves up to 0.2 mm, leaves scabrous; awn bigeniculate, upper segment with hairs 2–3 mm.

1520. Stipa lingua Junge



Phytogeographical element: I-T

Habitat: Steppes

Elevational range: 1500 - 3000

Flowering period: V - VI

Remarks: Cryptophyte; plants tufted, 20–70 cm high; awn unigeniculate, pilose at both segments, the upper segment straight 6– $10 \times longer$ than the lower.

1521. Stipa lipskyi Roshev.



Phytogeographical element: SE, I-T

Habitat: Steppes

Elevational range: 950 - 2400 Flowering period: V - VI

Remarks: Cryptophyte; plant 20–70 cm high; ligules of vegetative leaves up to 0.2 mm; anthecium 12–16 mm; awn unigeniculate, 14–22 cm, lower segment 14–30 mm,

smooth or slightly scabrous.

1522. Stipa macroglossa P.A. Smirn.



Phytogeographical element: SE, I-T

Habitat: Screes, steppes Elevational range: 1400 - 2400 Flowering period: V - VI

Remarks: Cryptophyte; plant 20–65 cm high; ligules of vegetative leaves over 4–8 mm; anthecium 13–14.5 mm;

awn bigeniculate, 20-32 cm.

1523. Stipa magnifica A. Junge



Phytogeographical element: E, I-T

Habitat: Steppes

Elevational range: 600 - 1400 Flowering period: V - VI

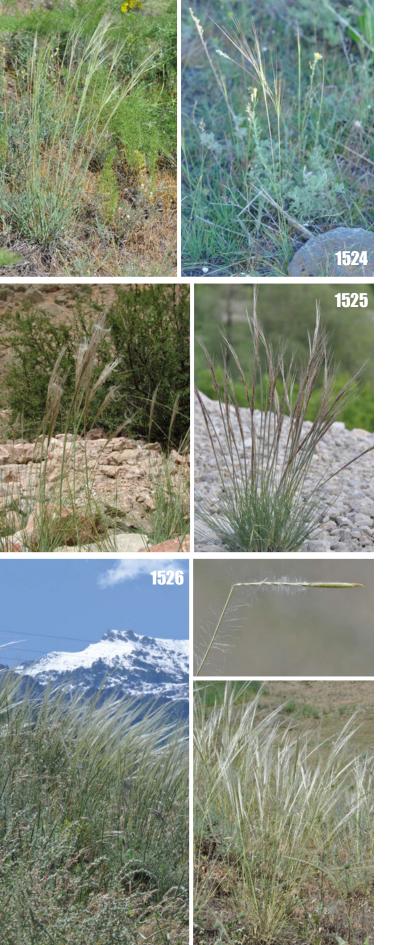
Remarks: Cryptophyte; plant 25–60 cm high; leaves glabrous, flat or convolute, at the upper surface densely and very shortly pilose, ligules very densely pilose with hairs up to 3 mm long; awn unigeniculate, glabrous below

and long pilose above geniculation.









1524. Stipa margelanica P.A. Smirn.



Phytogeographical element: SE, I-T

Habitat: Steppes

Elevational range: 1500 - 2000 Flowering period: V - VI

Remarks: Cryptophyte; plant 40–70 cm high; ligules of vegetative leaves 0.3–2 mm, leave glabrous; awn

bigeniculate, scabrous.

1525. Stipa orientalis Trin.



Phytogeographical element: EI-T

Habitat: Rocks, alpine semi-deserts, alpine steppes

Elevational range: 2300 - 4100 Flowering period: VI - VII

Remarks: Cryptophyte; plants tufted, 20–50 cm high; leaves scabrous; ligules 1–3 mm long; awn bigeniculate,

pilose.

Usefulness: For.

1526. Stipa ovczinnikovii Roshev.



Phytogeographical element: E, I-T

Habitat: Steppes

Elevational range: 1300 - 1800

Flowering period: V - VI

Remarks: Cryptophyte; plant 25–65 cm high; leaves glabrous, convolute, at the upper surface densely and long pilose, ligules very densely pilose; awn unigeniculate, glabrous below and long pilose above geniculation.

1527. Stipa regeliana Hack.



Phytogeographical element: EI-T

Habitat: Alpine swards Elevational range: 3800 - 4300 Flowering period: VI - VIII

Remarks: Cryptophyte; high alpine plant, 10–30 cm high; anthecium 5–8 mm long; awn 1.5–3.5 cm long, hairs on the upper segment of awn 0.1–0.3 mm long, and up to 1.5

on the lower.

1528. Stipa richteriana Kar. & Kir. subsp. jagnobica (Ovcz. & Czuk.) Tzvelev

Synonyms: Stipa jagnobica Ovcz. & Czuk.



Phytogeographical element: SE, I-T

Habitat: Steppes

Elevational range: 1500 - 2400 Flowering period: V - VI

Remarks: Cryptophyte; plant 20–70 cm high; ligules of vegetative leaves up to 0.2 mm; awn 4–8 cm, bigeniculate,

with hairs on the upper segment 0.1–0.3 mm.

1529. Stipa sareptana A. Beck.



Phytogeographical element: I-T, E-S

Habitat: Steppes

Elevational range: 1200 - 2600 Flowering period: V - VI

Remarks: Cryptophyte; plant 30–60 cm high, leaves scabrous; lemma with well poorly developed ring of hairs

at the apex; awn scabrous.





1530. Stipa subsessiliflora (Rupr.) Roshev.

Synonyms: Ptilagrostis subsessiliflora (Rupr.) Roshev.



Phytogeographical element: EI-T Habitat: Alpine swards, steppes Elevational range: 3850 - 4000 Flowering period: VII

Remarks: Cryptophyte; high alpine plant, 7–20 cm high; glumes 6–8 (–8.5) mm long; hairs on the upper segment of

awn 0.1-0.3 mm long, and 2-4 mm on the lower.

1531. Stipa × tadzhikistanica M. Nobis



Phytogeographical element: I-T

Habitat: Steppes

Elevational range: 1400 - 2400 Flowering period: V - VI

Remarks: Cryptophyte; plant 30–70 cm high; anthecium 10.5–14 mm; callus 1.8–2.4 mm long, base narrow; awn uniceniculate, lower segment scabrous and 6–12 times

shorter than the upper.

1532. Stipa tianschanica Roshev.



Phytogeographical element: EI-T Habitat: Rocks, screes Elevational range: 3000 - 3800

Flowering period: VII

Remarks: Cryptophyte; plant 15–40 cm high; leaves scabrous, ligules up to 1 mm long; awn unigeniculate, glabrous or scabrous below and long pilose above

geniculation.

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1533. Stipa zalesskii Wilensky



Phytogeographical element: I-T, E-S

Habitat: Steppes

Elevational range: 2000 - 2600 Flowering period: V - VI

Remarks: Cryptophyte; plant 40–80 cm high; leaves scabrous; lemma 18–21 mm, with ventral line of hairs

reaching the top; awn bigeniculate.

1534. Stipa zeravshanica M. Nobis



Phytogeographical element: E, I-T Habitat: Calcareous rocks Elevational range: 1300 - 2600 Flowering period: V - VI

Remarks: Cryptophyte; plant 15–35 cm high; ligules of vegetative leaves over 4 mm; anthecium (5–)6–7(–8) mm long, callus 0.8–1.2 mm long, awn bigeniculate,

throughout pilose.

1535. Taeniatherum caput-medusae (L.) Nevski subsp. asper (Simonk.) Melderis

Synonyms: Taeniatherum asperum (Simonk.) Nevski



Phytogeographical element: I-T, M Habitat: Ruderal, fields, steppes, forbs

Elevational range: 350 - 1850 Flowering period: V - VI

Remarks: Therophyte; plant 10–40 cm high; glumes distinctly divergent from rachis (more then 30°); awns

6–11 cm. Usefulness: For.





















1536. Taeniatherum caput-medusae (L.) Nevski subsp. crinitum (Schreb.) Melderis

Synonyms: Taeniatherum crinitum (Schreb.) Nevski



Phytogeographical element: I-T, M Habitat: Meadows, fields, steppes Elevational range: 400 - 2300 Flowering period: IV - VII

Remarks: Therophyte; plant 10–40 cm high; glumes slightly divergent from rachis (not more then 30°); awns

4–7 cm. Usefulness: For.

1537. Tragus racemosus (L.) All.



Phytogeographical element: M, I-T, E-S

Habitat: Ruderal

Elevational range: 950 - 1800 Flowering period: VI - VIII

Remarks: Therophyte; plant tufted, 5–20 cm high; leaf sheaths usually shorter than internodes; leaf blades linear, flat, 4–6 cm, 2–3 mm wide, margins thick, pectinate–

spinose, apex acute; spikelets elliptic.

1538. Trisetaria loeflingiana (Linn.) Paunero

Synonyms: Trisetaria cavanillesii (Trin.) Maire, Trisetum cavanillesii Trin.



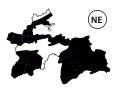
Phytogeographical element: M, I-T Habitat: Screes, steppes Elevational range: 500 - 1000

Flowering period: IV - VI

Remarks: Therophyte; plant 10–30 cm high; spikelets 1–5-flowered; lemmas shorter than the glumes, hyaline, prominently 2-toothed, the teeth setose, awned from above the middle with a geniculate awn spirally twisted in the lower half; stamens 3; stigmas 2.

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1539. Triticum aestivum L.



Phytogeographical element: Cultivated Habitat: Fields, ruderal habitats Elevational range: 400 - 2400 Flowering period: V - VI

Remarks: Therophyte; plant 60–150 cm, glumes with poorly deveoped keel, spike 7–10 times as long as wide.

1540. Vulpia ciliata Dumort.



Phytogeographical element: I-T, M Habitat: Meadows, steppes, forbs Elevational range: 400 - 1400 Flowering period: III - V

Remarks: Therophyte; plant 8–30 cm high; lemma of fertile florets 3(–5)-nerved, ciliate at middle and lateral veins.

Usefulness: For.

1541. Vulpia myuros (L.) C.C. Gmel.



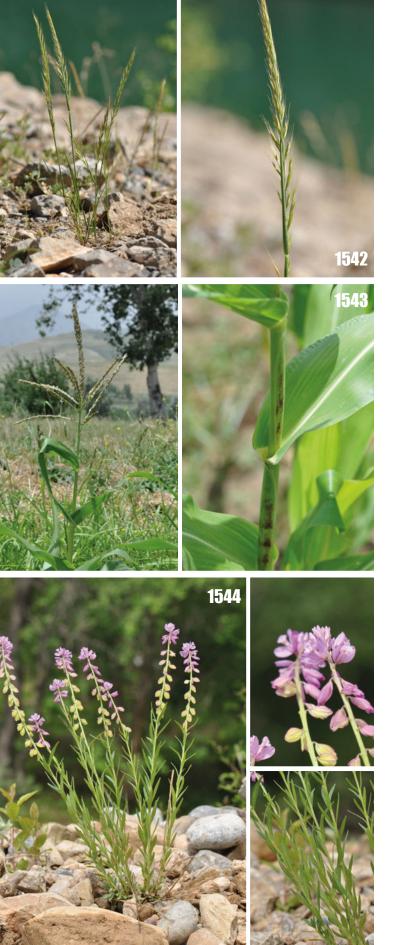
Phytogeographical element: I-T, E-S Habitat: Meadows, steppes, forbs Elevational range: 400 - 1400 Flowering period: III - V

Remarks: Therophyte; plant 8–40 cm high; lemma 5-nerved,

glabrous or scabrid; pedicels (0.6–)1–2.5 mm long.

Usefulness: For.





1542. Vulpia persica (Boiss. & Buhse) Krecz. & Bobrov



Phytogeographical element: I-T

Habitat: Screes, steppes, thermophilous shrubs

Elevational range: 600 - 1700 Flowering period: III - IV

Remarks: Therophyte; plant 5–25 cm high; lower glume $2-3 \times$ shorter than the upper; lemma glabrous or scabrous in the upper part; pedicels 0.4–0.6 mm long.

Usefulness: For.

1543. Zea mays L.



Phytogeographical element: Cultivated Habitat: Fiedls, ruderal habitats Elevational range: 350 - 1500 Flowering period: V - VII

Remarks: Therophyte; plant 150–300 cm; spikelets unisexual, the male in ample terminal panicle, the female in rows on thick woody axillary corb, enclosed in leaf

sheaths.

1544. Polygala comosa Schkuhr

Synonyms: Polygala hybrida DC.



Phytogeographical element: I-T, E-S

Habitat: Alpine meadows, steppes, xeric shrubs, forbs

Elevational range: 1800 - 3400 Flowering period: VI - VII

Remarks: Cryptophyte; plant 15–40 cm high, caespitose; leaves sessile; leaf blade green, elliptic or lanceolate, 1.5–4.5 \times 2–4 cm; racemes terminal; flowers dense; pedicel ca. 2 mm, glabrous; bracteoles 3, caducous; capsule oblong, ca. 6 mm, ca. 4 mm in diameter, glabrous, winged.

1545. Atraphaxis karataviensis Pavlov & Lipsch.

Synonyms: Atraphaxis pulcherrima Vassilcz.



Phytogeographical element: I-T Habitat: Rocks, screes Elevational range: 1400 - 1800 Flowering period: V - VI

Remarks: Nanophanerophyte; shrub 10-30 cm; branches shortened, thick, poorly visible internodes, without spikes; leaves 2-3 mm long, in bundles; flowers 1-3 in the axils of the leaves on the tips of young twigs; tepals 4;

perianth $5-6 \times 4-8$ mm, light or dark pink.

1546. Atraphaxis pyrifolia Bunge



Phytogeographical element: I-T Habitat: Loose sandy screes, screes Elevational range: 600 - 2700 Flowering period: IV - VI

Remarks: Nanophanerophyte; shrub up to 1.2 m high, much branched; flowers dense in racemes at lateral branchlets of current year; tepals 5, light yellow or yellowred; outer tepals reflexed in fruit.

1547. Atraphaxis seravschanica Pavlov



Phytogeographical element: I-T Habitat: Rocks, screes, steppes Elevational range: 1100 - 2600 Flowering period: V - VII

Remarks: Nanophanerophyte; shrub 50-90 cm high; leaves 0.5-1.5 cm long, oval, reniform or broadly elliptic, round or shortly truncated at the base, with a short tip at the apex, lateral veins of leaves prominent; flowers in dense panicles 4-8 cm long, terminal or lateral; tepals 5; perianth 5-7 mm, pink or red with a white edge.

















1548. Atraphaxis spinosa L.



Phytogeographical element: I-T, E-S, M Habitat: Loose sandy screes, steppes

Elevational range: 700 - 2800 Flowering period: IV - V

Remarks: Nanophanerophyte; shrub 30–100 cm high; herbaceous branchlets of current year longer, slender, without papillate hairs; stems with thorns; leaves alternate, young without papillate hairs; perianth 2–2.5 mm, pink with white edges; tepals 4; stamens 6; styles 2; achenes lenticularly compressed.

Usefulness: Ind.

1549. Atraphaxis virgata (Regel) Krasn.



Phytogeographical element: I-T, E-S Habitat: River beds, screes Elevational range: 1600 - 1900 Flowering period: VI - VII

Remarks: Nanophanerophyte; shrub 1–2 m high; branches lengthened, usually branched; leaf blade gray-green, oblong-elliptic or oblong-obovate, large, 2–2.5 × 0.7–0.9 cm, both surfaces glabrous, veins conspicuous only abaxially; panicle with leaves, 3–15 cm long; perianth 4–5 mm long, pink with white edges; tepals 5; stamens 8; styles 3; achenes trigonous.

1550. Oxyria digyna (L.) Hill

Synonyms: Oxyria elatior R. Br. ex Meissn.



Phytogeographical element: Plurireg

Habitat: River beds, loose sandy screes, nitrophilous rock footings

Elevational range: 1800 - 3900 Flowering period: VI - IX

Remarks: Cryptophyte; plant 15–30 cm high; stems usually glabrous; leaves nearly all basal; petiole 3–12 cm; leaf blade papery, margin subentire; flowers bisexual.

Usefulness: Med, Ind.

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1551. Persicaria maculata (Raf.) Gray

Synonyms: Polygonum maculatum Rafin., Polygonum persicaria L.



Phytogeographical element: Plurireg

Habitat: River beds, fields Elevational range: 300 - 2700 Flowering period: V - X

Remarks: Therophyte; plant 40–80 cm high; stems without basal leaves; leaves petiolate; leaf blade lanceolate or elliptic, often with a dark triangular spot at middle; ocrea tubular, membranous, sparsely pubescent, apex truncate; perianth reddish or deep purple, usually 5-parted; tepals oblong, 2.5–3 mm; achenes biconvex, rarely trigonous.

Usefulness: Med, For.

1552. Persicaria vivipara (L.) Ronse Decr.

Synonyms: Bistorta vivipara (L.) S.F. Gray, Polygonum viviparum L.



Phytogeographical element: Plurireg Habitat: Alpine meadows, fens and mires

Elevational range: 2000 - 4800 Flowering period: V - VIII

Remarks: Cryptophyte; plant 15–60 cm high; stems usually 2 or 3 from rhizome, erect, simple; basal leaves oblong, ovate-lanceolate or linear; cauline leaves not clasping; ocrea lower part green, upper brown, tubular, membranous, not ciliate; inflorescence lower part with bulbils; perianth white or pinkish, 5-parted; tepals broadly elliptic, 2–3 mm.

Usefulness: Med, For, Foo.

1553. Polygonum aviculare L.



Phytogeographical element: Plurireg

Habitat: Roadsides, arable fields, steppes, ruderal habitats

Elevational range: 500 - 2800 Flowering period: IV - X

Remarks: Cryptophyte; plant prostrate, ascending, or erect, 10–40 cm high, much branched from base; leaf blade lanceolate or narrowly elliptic, 1–4 cm × 3–12 mm, both surfaces glabrous; flowers 1–5; axillary; bracts thinly membranous; perianth green, margin white or pinkish.















1554. Polygonum coriarium Grig.

Synonyms: Aconogonon coriarium (Grig.) Soják



Phytogeographical element: , I-T

Habitat: Forbs

Elevational range: 1200 - 3400 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 1–1.5(–2.5) m; stems usually erect; leaves ovate to obovate-lanceolate with cuneate or rounded base; inflorescence of terminal panicle only, with numerous dense flowered clusters; pedicel not articulate; fruits neither baccate nor enclosed by fleshy but normal thin tepals.

Usefulness: Med, For, Foo, Ind, Orn.

1555. Polygonum mezianum H. Gross



Phytogeographical element: EI-T

Habitat: Loose sandy screes, screes, alpine semi-deserts

Elevational range: 2400 - 4500 Flowering period: VI - VII

Remarks: Chamaephyte; subshrub 4–7 cm; stems and branches strongly shortened, close together, forming friable pillows; leaves 7–9 mm long, linear-lanceolate; outer perianth lobes without spur or with very short almost imperceptible spur; achenes 1.5–2 mm long.

1556. Polygonum molliiforme Boiss.



Phytogeographical element: I-T Habitat: River beds, steppes Elevational range: 2100 - 4400 Flowering period: VI - IX

Remarks: Therophyte; plant 5–10 cm; stems erect, usually purple-red, slender, glabrous; petioles very short or nearly absent; leaves linear or subulate; ocrea silvery, narrowly ovate, thinly membranous, apex acute; flower solitary, axillary; pedicel short; perianth membranous, cleft to 3/4;

achenes biconvex, smooth, shiny.

1557. Polygonum paronychioides C.A. Mey.



Phytogeographical element: I-T, E-S

Habitat: River beds, broad-leaved forests, screes, steppes, xeric

shrubs

Elevational range: 600 - 3700 Flowering period: V - VII

Remarks: Chamaephyte; subshrub 5–15 cm high; leaves 1.5 cm long, edges rolled, one pronounced vein on abaxial side, white spike at the top; ocrea broadly lanceolate, 5–8 mm, thinly membranous, margin lacerate, apex acute; flower solitary, axillary; perianth pinkish, 5 cleft up to 1/2; tepals unequal, outer 2 narrowly lanceolate, ca. 2 mm, inner 3 elliptic, shorter.

1558. Polygonum polycnemoides Jaub. & Spach



Phytogeographical element: I-T, M

Habitat: Loose sandy screes, screes, ruderal, fields, steppes

Elevational range: 800 - 3400 Flowering period: V - VI

Remarks: Therophyte; plant 5–20 cm high; stems prostrate or suberect, scabrous, internodes shorter than leaves; petioles very short or nearly absent; leaves linear or subulate; ocrea white, narrowly ovate, connate at base, thinly membranous, margin sparsely lacerate, apex 2-lobed; flowers 1 or 2; perianth cleft to 1/3; achenes trigonous, densely punctate.

1559. Polygonum serpyllaceum Jaub. & Spach

Synonyms: Polygonum kudrjaschevii Vassilkovsk., P. pamiroalaicum Kom.



Phytogeographical element: I-T

Habitat: Alpine meadows, fens and mires

Elevational range: 2000 - 4200 Flowering period: VI - VIII

Remarks: Cryptophyte; plant; petioles short, 1–2 mm long; leaves 0.5–1(–1.4) cm long, obovate or ovate-lanceolate; ocrea broad, in lower part of stems brownish, in upper semi-transparent; perianth 2–2.5 mm long, during fruiting

3-4.5 mm; achenes 2.5-2.8 mm long.

Usefulness: For.

















1560. Polygonum sibiricum Laxm. var. thomsonii Meisn.

Synonyms: Knorringia pamirica (Korsh.) Tzvelev, Polygonum pamiricum Korsh.



Phytogeographical element: EI-T

Habitat: Fens and mires, fields, salt marshes

Elevational range: 3700 - 4700 Flowering period: VI - VII

Remarks: Cryptophyte; plant 2–25(–43) cm high; stems erect, branched, without retrorse prickles and basal leaves; petiole 0.8–1.5 cm, not articulate; leaves narrowly elliptic or lanceolate to linear, basally usually hastate; ocrea tubular, membranous, apex oblique, not ciliate; inflorescence paniculate; filaments not dilated at base; flowers bisexual.

1561. Polygonum songaricum Schrenk ex Fisch. & C.A. Mey.

Synonyms: Aconogonon songaricum (Schrenk) Hara



Phytogeographical element: EI-T

Habitat: Forbs

Elevational range: 1800 - 3800 Flowering period: VI - VII

Remarks: Cryptophyte; plant 20–60 cm high; stems erect, branched, pilose, striate without basal leaves; leaves ovate or broadly ovate, $5-10\times3-5$ cm, base rounded or cordate, margin entire or slightly undulate, ciliate, apex acuminate; ocrea brown, 2–3 cm, membranous, dehiscent above; inflorescence paniculate; perianth red; flowers bisexual; pedicels articulate.

Usefulness: For, Foo, Ind.

1562. Rheum fedtschenkoi Maxim. ex Regel



Phytogeographical element: E, I-T

Habitat: Screes

Elevational range: 3100 - 3700 Flowering period: VI - VIII

Remarks: Cryptophyte; plant up to 10-30 cm high; basal leaves oval or ovate with 5 main veins, adaxial surface nearly glabrous, abaxial surface densely hairy; flowers gathered in groups of 6-8; fruit large, $1.2-1.5 \times 1.7$ cm.

Usefulness: For, Ind.

1563. Rheum macrocarpum Losinsk.

Synonyms: Rheum ferganense Titov, R. lobatum Litv. ex Losinsk., R. nuratavicum Titov



Phytogeographical element: I-T Habitat: Screes, thermophilous shrubs

Elevational range: 650 - 2100

Flowering period: IV

Remarks: Cryptophyte; plant up to 40-60 cm high; basal leaves large, 3-5 lobed with 3 major veins; fruits 2.5-3 cm long, achenes 10×7 mm, wings equal to achenes.

Usefulness: Ind.

1564. Rheum maximowiczii Losinsk.



Phytogeographical element: I-T

Habitat: Screes

Elevational range: 1100 - 3900 Flowering period: IV - V

Remarks: Cryptophyte; plant up to 1 m high; leaves rounded-reniform with 3 major veins, adaxial surface glabrous, abaxial villous, papillose; fruit 1.7 cm long.

Usefulness: Foo.













1565. Rheum reticulatum Losinsk.



Phytogeographical element: EI-T

Habitat: Rocks, screes

Elevational range: 3200 - 4200 Flowering period: VI

Remarks: Cryptophyte; plant $10{\text -}30$ cm high; leaves triangular-ovate, pubescent abaxially, apex obtuse to acute; panicle much branched from base; perianth yellowwhite; fruit broadly ovoid, $7.5{\text -}8.5 \times 7{\text -}8$ mm, wings ca. 2.5 mm wide, achenes ovoid.

Usefulness: For.

1566. Rheum wittrockii C.E. Lundstr.



Phytogeographical element: I-T Habitat: Meadows, pastures Elevational range: 2700 - 3500

Flowering period: V

Remarks: Cryptophyte; plant 50-100 cm high; basal leaves 2-4; petiole ca. as long as blade; leaf blades ovate to triangular-ovate, $15-26 \times 10-20$ cm, abaxially pubescent near veins, adaxially glabrous, basal veins 5-7, base cordate, margin sinuolate, apex obtuse or acute; panicle large, sparsely branched; fruit 1.2×1.5 cm, wings broad, 4-5 mm, achenes ovoid, ca. 6 mm wide.

Usefulness: Foo, Ind.

1567. Rumex crispus L.



Phytogeographical element: Plurireg

Habitat: Meadows, pastures, ruderal vegetation

Elevational range: 400 - 2400 Flowering period: IV - VII

Remarks: Cryptophyte; plant 50–120(–150) cm tall, simple or branched above; leaves shortly petiolate, lanceolate or narrowly lanceolate, margin strongly crisped and

undulate, apex acute; flowers bisexual.

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1568. Rumex dentatus L. subsp. halacsyi (Rech.) Rech. f.

Synonyms: Rumex halacsyi Rech.



Phytogeographical element: I-T, M

Habitat: Pastures, fields, littoral vegetation

Elevational range: 400 - 800 Flowering period: IV - VII

Remarks: Therophyte, hemicryptophyte; plant 30–70 cm high; leaves 9×1.5 –2 cm, oval-oblong; fruit valves oblong-triangular (not rounded), margin with 3–5 narrow

teeth up to 3 mm long; achenes 2.5×1.5 mm.

1569. Rumex paulsenianus Rech. f.



Phytogeographical element: I-T, Himal

Habitat: Forbs

Elevational range: 1800 - 3600 Flowering period: V - VIII

Remarks: Cryptophyte; plant up to 1–2 m high; stem branching; lower leaves large, oblong-ovate, with cordate base; panicle very large, lower branches fasciculate and richly branching; pedicels 2.5–3.5 cm long, articulate at half of their length; fruit valves 5.5–7 mm, margin nearly entire, with middle nerve slightly increassate towards the

base; achenes $3-3.5 \times 2.2$ mm.

Usefulness: Ind.

1570. Rumex syriacus Meisn.



Phytogeographical element: I-T, M Habitat: Orchards and gardens, fields

Elevational range: 800 - 1600 Flowering period: V - VIII

Remarks: Cryptophyte; plant 50–100 cm tall; leaves 10–25 cm long; valves oblong-ovate, margin with with

4-6(-9) narrow teeth; nut 3×2 mm.





















1571. Portulaca oleracea L.



Phytogeographical element: I-T, E-S, M, Orient

Habitat: River beds, ruderal, fields Elevational range: 400 - 3250 Flowering period: VI - IX

Remarks: Therophyte; plant prostrate or erect, ca. 25 cm high; leaves alternate, 10–30 mm; flowers often in clusters of 3 or more; mature seeds glossy black, never iridescent.

Usefulness: Foo.

1572. Potamogeton berchtoldii Fieber



Phytogeographical element: Plurireg Habitat: Rivers, aquatic vegetation Elevational range: 1300 - 2500 Flowering period: V - VII

Remarks: Cryptophyte; plant with stem branched; stipules open; turions mainly terminal on shoots; flowers with

(3-)4(-7) carpels.

1573. Potamogeton gramineus L.

Synonyms: Potamogeton heterophyllus Schreb.



Phytogeographical element: Plurireg

Habitat: Rivers, alpine ponds, aquatic vegetation

Elevational range: 750 - 4300 Flowering period: VI - VIII

Remarks: Cryptophyte; plant with stem unbranched or weakly branched; leaves denticulate (especially young), all

sessile, with 3–4 pairs lateral veins.

1574. Potamogeton nodosus Poir.



Phytogeographical element: Plurireg

Habitat: Rivers, rice fields, aquatic vegetation

Elevational range: 500 - 1850 Flowering period: V - VII

Remarks: Cryptophyte; plant with stem unbranched or weakly branched; submenged leaves with normally developed leaf blade, decay early in the season; floating leaves without diffrently built junction between blade and

petole; fruit 3-4 mm long.

1575. Potamogeton perfoliatus L.



Phytogeographical element: Plurireg

Habitat: Rivers, rice fields, alpine ponds, aquatic

vegetation

Elevational range: 400 - 3600 Flowering period: V - VII

Remarks: Cryptophyte; plant with stems richly branched in upper part; stipule delicate, hyaline, fugacious (well visible only on young leaves), leaves amplexicaul, floating

leaves absent.

1576. Potamogeton pusillus L.

Synonyms: Potamogeton panormitanus Biv.



Phytogeographical element: Plurireg Habitat: Rivers, aquatic vegetation Elevational range: 500 - 1500 Flowering period: V - VII

Remarks: Cryptophyte; plant with branched stems; stipules tubular; turions mainly sessile, axillary; flowers

with (3-)4(-7) carpels.











1577. Stuckenia amblyphylla (C.A. Mey.) Holub

Synonyms: Potamogeton amblyphyllus C.A. Mey.



Phytogeographical element: I-T, E-S Habitat: Rivers, alpine ponds Elevational range: 1800 - 2500 Flowering period: VI - VIII

Remarks: Cryptophyte; plant perennial, submerged, up to 1-1.5 m long; sheaths 0.6-4 cm, appearing as a closed ellipse when transversely dissected, persistent; leaves sessile, filiform, 5-10 cm \times 0.7-2.4 mm, 3-veined, apex obtuse to rounded.

1578. Stuckenia filiformis (Pers.) Börner

Synonyms: Potamogeton filiformis Pers.



Phytogeographical element: Plurireg Habitat: Rivers, alpine ponds Elevational range: 2500 - 4300 Flowering period: VI - VIII

Remarks: Cryptophyte; plant mostly richly branched near base of stem and unbranched above; leaf sheaths closed and tubular at base (connate) at least when young, appearing as a closed ellipse when transversally sectioned; mature fruits greenish.

1579. Stuckenia pamirica (Baagøe) Z. Kaplan

Synonyms: Potamogeton pamiricus Baagøe



Phytogeographical element: EI-T Habitat: Rivers, alpine ponds Elevational range: 2000 - 4500 Flowering period: VI - VII

Remarks: Cryptophyte; plants unbranched, moderately or richly branched near base and sparingly branched above; hyaline edges of leaf sheaths creamy yellowish, markedly contrasting with the dark sheaths; leaf blades sometimes recurved towards apex, sometimes even twisted spirally when dried.

1580. Stuckenia pectinata (L.) Börner

Synonyms: Potamogeton pectinatus L.



Phytogeographical element: Plurireg

Habitat: Rivers, aquatic vegetation, water bodies

Elevational range: 500 - 2600 Flowering period: VI - VIII

Remarks: Cryptophyte; plants moderately or richly branched, branches evenly distributed along stem; leaf sheat open and convolute along entire length; mature

fruits yellow-brownish.

1581. Anagallis arvensis L.



Phytogeographical element: Plurireg

Habitat: Broad-leaved forests, meadows, ruderal, fields,

steppes, thermophilous shrubs Elevational range: 400 - 2200 Flowering period: III - VIII

Remarks: Therophyte; plant 5–50 cm high; corolla petals red-orange, glandular-pubescent on edges, entire.

Usefulness: Med, Foo.

1582. Anagallis foemina Mill.

Synonyms: Anagallis arvensis L. subsp. foemina (Mill.) Schinz & Thell.



Phytogeographical element: Plurireg

Habitat: Meadows, screes, orchards and gardens, fields,

steppes

Elevational range: 500 - 2100 Flowering period: IV - VII

Remarks: Therophyte; plant 5–50 cm high; petals mainly

azure, serrate.













1583. Androsace akbaitalensis Derganc ex O. Fedtsch.

Synonyms: Androsace acrolasia Vved. & Ovcz.



Phytogeographical element: I-T

Habitat: Rocks, screes, moraines and snow-beds

Elevational range: 3800 - 4800 Flowering period: VII - VIII

Remarks: Cryptophyte; plant up to 10 cm high; leaves in +/- flattened rosettes, pale green with short white strigose hairs on upper half; calyx 3–8 mm long,

campanulate.

1584. Androsace caduca Ovcz.



Phytogeographical element: E, I-T

Habitat: Steppes

Elevational range: 2500 - 3600

Flowering period: VII

Remarks: Cryptophyte; plant up to 7 cm high; the species is similar to *Androsace pavlovskyi* Ovcz., but easy distinguished by longer pedicels, which are ca. 2 × longer

than bracts.

1585. Androsace fedtschenkoi Ovcz.



Phytogeographical element: I-T

Habitat: Rocks, screes

Elevational range: 2700 - 4400

Flowering period: VI

Remarks: Therophyte; plant 2-12 cm high; scapes equal to

pedicels or shorter; corolla milk-white.

1586. Androsace lehmanniana Spreng.

Synonyms: Androsace bungeana Schischk. & Bobrov, A. chamaejasme Wulfen subsp. lehmanniana (Spreng.) Hultén



Phytogeographical element: I-T Habitat: Alpine swards, steppes Elevational range: 3000 - 4000 Flowering period: VIII

Remarks: Cryptophyte; plant 4-8 cm high; laxly cespitose; rosettes more than 1.5 cm in diameter; inner leaves

distinctly longer than outer.

1587. Androsace maxima L.

Synonyms: Androsace turczaninowii Freyn



Phytogeographical element: Plurireg

Habitat: Steppes

Elevational range: 1000 - 4350

Flowering period: V

Remarks: Cryptophyte; plant up to 8 cm high; scapes several times longer than pedicels; calyx pubescent.

1588. Androsace ovczinnikovii Schischk. & Bobrov

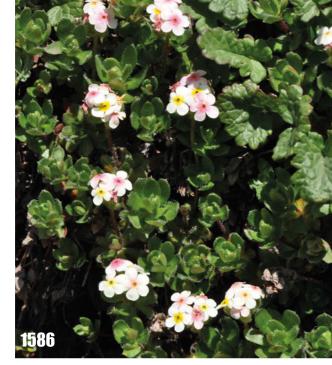


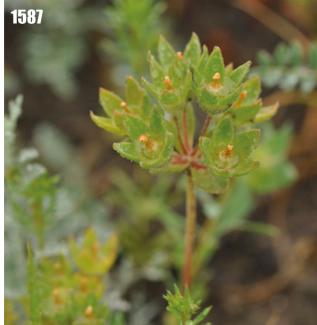
Phytogeographical element: I-T Habitat: Alpine swards Elevational range: 3300 - 4700

Flowering period: VII - VIII

Remarks: Cryptophyte; plant 4–10 cm high; leaf rosettes forming loose tufts, internodes of shoots $1-2 \times$ as long as leaf rosettes; bracts elliptic to ovate-lanceolate; corolla

white, becoming pink.











1589. Cortusa matthioli L. subsp. turkestanica (Losinsk.) Iranshahr & Wendelbo

Synonyms: Cortusa turkestanica Losinsk.



Phytogeographical element: I-T Habitat: Fens and mires, forbs Elevational range: 1700 - 3300 Flowering period: V - VII

Remarks: Cryptophyte; plant 25–60 cm high; leaf blade 10–16 cm wide, leaf lobes coarsely dentate, petiole up to 30(–40) cm long, widely winged; involuclar bracts broad, leaflike, at the top irregularly dentate; corolla tube very short, nearly inconspicious; stamen filaments fused in a ring; anthers pointed at the top; style longer than corolla.

1590. Dionysia involucrata Zapriag.



Phytogeographical element: E, I-T

Habitat: Rocks

Elevational range: 1200 - 2500

Flowering period: IV - VI

Remarks: Cryptophyte; plant 5–10 cm high; cushionlike, glandular; shoots covered with imbricated small, brownish old leaves and rosettes of young green leaves; inflorescence a stalked 3- to 5-flowered umbel, with large bracts at the base (larger than leaves); corolla dark pink to light violet, with tube 2–3.5 cm long (3–4 times longer than the calyx).

1591. Lysimachia maritima (L.) Galasso, Banfi & Soldano

Synonyms: Glaux maritima L.



Phytogeographical element: Plurireg

Habitat: Meadows, fens and mires, fields, salt marshes

Elevational range: 1800 - 4000 Flowering period: V - VIII

Remarks: Cryptophyte; plant 5–20(–30) cm high; glabrous, rooting at the nodes; the nodes with scaly and opposite leaves; stem prostrate to ascending; leaves × fleshy, 5–12 × 2.5–5.5 mm, elliptic-oblong to ovatelanceolate, acute or obtuse, pale green, sessile, uppermost smaller, crowded, often glandular-punctate, margin whitish; flowers axillary solitary, barely exserted from the subtending leaf, lilac or pink, subsessile; pedicel 1–1.5 mm long; capsule globose, opening downwards with 5 slits.

1592. Primula algida Adams



Phytogeographical element: I-T, E-S

Habitat: Alpine swards Elevational range: 2500 - 4700 Flowering period: VI - VII

Remarks: Cryptophyte; plant 3–15 cm high; farinose; involucres pendent; flower peduncles equal.

1593. Primula baldshuanica B. Fedtsch.



Phytogeographical element: SE, I-T

Habitat: Juniper forests, meadows, xeric shrubs,

thermophilous shrubs Elevational range: 750 - 2200 Flowering period: III - V

Remarks: Cryptophyte; plant 7–25 cm high; leaves 3–6 cm long, glabrous on the upperside, usually farinose on the bottomside; finely, irregularly dentate leaf margin; loose, elongated inflorescence; flowers with conspicious peduncles; involucral bracts with tubercles at the base; calyx 5–7 mm long; corolla diameter 1–1.6 cm.



















1594. Primula geranophylla Kovalevsk.



Phytogeographical element: E, I-T

Habitat: Juniper forests, broad-leaved forests, rocks,

thermophilous shrubs Elevational range: 1000 - 1800 Flowering period: IV - V

Remarks: Cryptophyte; plant 10–30 cm high; leaves light green, (2–)3–7(–8) cm long, (3–)4–9 cm wide, up to 1/2 divided into rhomboid, elongated lobes (resembling leaves of Geranium); corolla diameter 1.5–1.8 cm; corolla glabrous, with lobes only little incised, light purple, corolla tube dark purple; calyx densely glandular; capsule nearly spherical.

1595. Primula kaufmanniana Regel



Phytogeographical element: I-T

Habitat: Riverside forests, rocks, moraines and snow-beds

Elevational range: 1500 - 3500 Flowering period: V - VII

Remarks: Cryptophyte; plant 10–25(–30) cm high; leaves deeply divided to obovate-shaped lobes; calyx teeth

lanceolate.

1596. Primula lactiflora Turkev.

Synonyms: Primula turkeviczii V.V. Byalt



Phytogeographical element: E, I-T Habitat: Meadows, forbs Elevational range: 2200 - 3000

Flowering period: V - VI

Remarks: Cryptophyte; plant 15-25 cm high; corolla white

with violet tube; calyx with apparent veins.

1597. Primula macrophylla D. Don



Phytogeographical element: Plurireg

Habitat: Fens and mires, alpine swards, moraines and snow-beds

Elevational range: 3500 - 5000 Flowering period: V - VIII

Remarks: Cryptophyte; plant (7–)10–35 cm high; rosette base usually with fibrous, brownish-black remnants of last year's leaves; leaves (4–)5–10 cm long, 1.5–4 cm wide, fleshy, bluish, narrowly lanceolate to oblong-elliptical; leaf margin irregularly crenate; corolla with pinkish-violet lobes and lighter tube; calyx 6–13 mm long, dark violet; capsule cylindrical, $2 \times$ (or less) longer than calyx.

1598. Primula minkwitziae W.W. Sm.

Synonyms: Auganthus minkwitziae (W.W.Sm.) Soják



Phytogeographical element: SE, I-T Habitat: Rocks, moraines and snow-beds

Elevational range: 2500 - 2700 Flowering period: V - VI

Remarks: Cryptophyte; leaves dark-green on the upperside, and lighter on the bottomside; leaves orbicular-cordate or reniform; up to 1/3 of the length with rounded lobes; umbel with 5–10 flowers; corolla violet-purple, often with yellow spot inside; calyx densely glandular; capsule elongated.

1599. Primula nivalis Pall. var. farinosa Schrenk ex Fisch. & C.A. Mey.

Synonyms: Primula turkestanica E.A. White



Phytogeographical element: EI-T Habitat: Alpine swards, fens Elevational range: 2800 - 3900 Flowering period: VI - VIII

Remarks: Cryptophyte; plant up to 35 cm high; leaves in rosette, petiole broadly winged, $6-16 \times 1-4$ cm, glabrous, white farinose abaxially; scapes 10-25 cm, elongating to 35 cm in fruit; pedicels white farinose; umbels 8-20-flowered; bracts lanceolate 5-14 mm; calyx tubular 6-11 mm; corolla

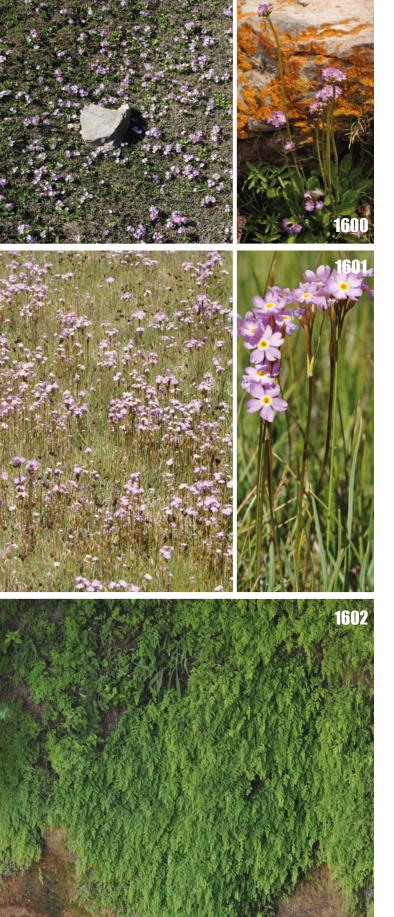
tube 0.8-1.5 cm; limb 1.5-2.5 cm wide.











1600. Primula olgae Regel



Phytogeographical element: I-T

Habitat: Riverside forests, fens and mires

Elevational range: 1700 - 3700 Flowering period: III - VIII

Remarks: Cryptophyte; plant 5–20 cm high; plant glabrous; inflorescence head shaped; perianths longer than flower

peduncles.

1601. Primula pamirica Fed.



Phytogeographical element: I-T Habitat: Fens and mires Elevational range: 3100 - 4200 Flowering period: V - VIII

Remarks: Cryptophyte; plant 10–30 cm high; whole plant not–farinose; leaf rosette dense; leaves 1.5–3 cm long, elliptical to obovate, lobed with entire margin (or little dentate); petioles narrowly winged, of equal length or sligtly longer than leaf blade; inflorescence shoots thick; involucral bracts with ear–shape 1–2 mm long appendages at the base; corolla diameter 1–2 cm, corolla lobes deeply incised, pale pink, corolla tube brighter than lobes; calyx tube spotted with black dashes; capsule cylindrical–elongated, equal or a bit longer than calyx.

1602. Adiantum capillus-veneris L.



Phytogeographical element: I-T, M, E-S

Habitat: Rocks, springs Elevational range: 850 - 2400 Sporing period: VI to VIII

Remarks: Cryptophyte; plants terrestrial or epilithic, 10–40 cm high; lamina ovate-triangular in outline; veins multidichotomously forked, visible on both surfaces.

Usefulness: Med, Orn.

1603. Cheilanthes persica (Bory) Mett. ex Kuhn



Phytogeographical element: I-T, M

Habitat: Rocks

Elevational range: 550 - 1750 Sporing period: VII to VIII

Remarks: Cryptophyte; plant 5–12 cm high; leaves glabrous on upper side, beneath densely pubescent.

1604. Cryptogramma stelleri (S.G. Gmel.) **Prantl**

Synonyms: Allosorus minutus Turcz. ex Trautv.



Phytogeographical element: I-T, E-S, N Americ

Habitat: Rocks

Elevational range: 2000 - 3000

Sporing period: VII

Remarks: Cryptophyte; plant with sterile frond 3-8 cm, fertile frond 6-12 cm and yellowish green lamina, 1- or 2-pinnate; pinnules 1 or 2 pairs, anadromous, broadly lanceolate, base cuneate, apex acute or obtuse; sori borne at vein tips.

1605. Pyrola rotundifolia L.



Phytogeographical element: I-T, E-S

Habitat: Broad-leaved forests, xeric shrubs, thermophilous

shrubs

Elevational range: 2000 - 3600 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 15-40 cm high; leaves 4-7, semievergreen; petiole ca. $2 \times$ or ca. as long as blades; leaf blade slightly green abaxially, green adaxially, slightly shiny, orbicular to ovate; flowers 1.5–2 cm in diameter; sepals ca. 1/2-2/3 as long as petals.



































1606. Aconitum leucostomum Vorosch.



Phytogeographical element: EI-T, E-S Habitat: Forbs, juniper forests Elevational range: 900 - 2600 Flowering period: VII to IX

Remarks: Cryptophyte; plant ca. 1 m high; leaf blade ca. 14 × 18 cm, abaxially sparsely retrorse pubescent, adaxially glabrous; sepals abaxially pubescent; spur slightly circinate, longer than lip, stamens glabrous; filaments entire.

1607. Aconitum nemorum Popov

Synonyms: Aconitum saposhnikovii B. Fedtsch



Phytogeographical element: EI-T Habitat: Coniferous forests Elevational range: 2300 - 3300 Flowering period: VII to IX

Remarks: Cryptophyte; plant ca. 1 m high; leaf blade pentagonal, both surfaces sparsely pubescent or nearly glabrous; inflorescence terminal, 2–6-flowered; rachis and pedicels sparsely spreading pubescent; sepals purple, abaxially sparsely spreading pubescent; spur incurved, ca. 1 mm.

1608. Aconitum rotundifolium Kar. & Kir.



Phytogeographical element: I-T, Himal Habitat: Alpine meadows, alpine steppes

Elevational range: 3200 - 4400 Flowering period: VI to VIII

Remarks: Cryptophyte; plant 7–25(–65) cm high;

5 leaflets; perianth pale purple.

Usefulness: Med.

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1609. Aconitum serayschanicum Steinb.



Phytogeographical element: E, I-T

Habitat: Juniper forests, alpine meadows, steppes

Elevational range: 2400 - 3600 Flowering period: VI to VII

Remarks: Cryptophyte; plant up to 100 cm high; 5 leaflets;

perianth nearly yellow.

1610. Aconitum talassicum Popov



Phytogeographical element: E, I-T Habitat: Fens and mires, forbs Elevational range: 2300 - 2850 Flowering period: VII to VIII

Remarks: Cryptophyte; plant up to 150 cm high; 3 leaflets;

perianth purple. Usefulness: Med, Foo.

1611. Adonis aestivalis L.



Phytogeographical element: I-T, M, E-S

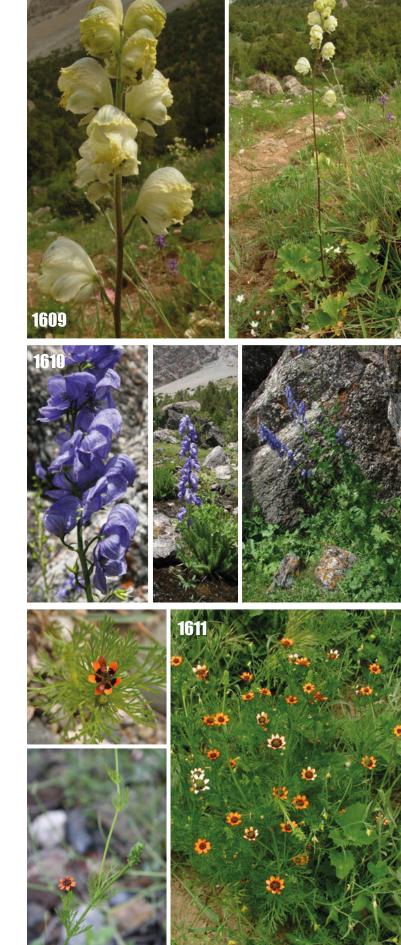
Habitat: Fields, steppes, xeric shrubs, thermophilous

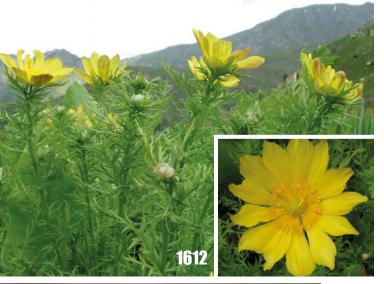
shrubs

Elevational range: 600 - 3400 Flowering period: IV to V

Remarks: Therophyte; plant 20–60 cm high; sepals, calyx

and fruits glabrous.









1612. Adonis turkestanica (Korsh.) Adolf

Synonyms: Adonis apennina L. var. turkestanica Korsh.



Phytogeographical element: E, I-T

Habitat: Pastures, steppes, xeric shrubs, forbs

Elevational range: 2000 - 3200 Flowering period: VI to VII

Remarks: Cryptophyte; plant 30-80 cm high; yellow

flowers with pubescent sepals.

Usefulness: Med.

1613. Anemone baissunensis Juz. ex M.M. Sharipova

Synonyms: Anemone coronaria L. var. intermedia Regel



Phytogeographical element: E, I-T

Habitat: Meadows, steppes, xeric shrubs, thermophilous

shrubs

Elevational range: 600 - 2200 Flowering period: III to IV

Remarks: Cryptophyte; plant (5–)10–30 cm high; flowers (2–)3–6 cm in diameter; petals yellow, sometimes with

slighly pink or orange tinge.

Usefulness: Orn.

1614. Anemone biflora DC. var. gortschakowii (Kar. & Kir.) Sinno

Synonyms: Anemone gortschakowii Kar. & Kir., Anemone oligotoma Juz.



Phytogeographical element: I-T

Habitat: Steppes

Elevational range: 2300 - 4100 Flowering period: VI to VII

Remarks: Cryptophyte; plant 10–20 cm high; rhizome simple, tuberous; basal leaves nearly round, 3(–5)-sect, segments subsessile; involucral bracts palmately parted.

Usefulness: Orn.

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1615. Anemone bucharica (Regel) Finet & Gagnep.

Synonyms: Anemone coronaria L. var. bucharica Regel



Phytogeographical element: E, I-T Habitat: Meadows, thermophilous shrubs

Elevational range: 700 - 2500 Flowering period: III to IV

Remarks: Cryptophyte; plant 20–27 cm high; flowers 3–6 cm in diameter; petals red; anthers greyish–purple.

Usefulness: Orn.

1616. Anemone narcissiflora L. subsp. protracta (Ulbr.) Ziman & Fedor.

Synonyms: Anemonastrum protractum (Ulbr.) Holub, Anemone protracta (Ulbr.) Juz.



Phytogeographical element: I-T

Habitat: Juniper forests, alpine meadows, steppes

Elevational range: 2800 - 3400 Flowering period: VI to VIII

Remarks: Cryptophyte; plant 15–30(–35) cm high, without

thickened rhizomes; fruits glabrous, flattened.

Usefulness: Orn.

1617. Anemone seravschanica Kom.



Phytogeographical element: E, I-T

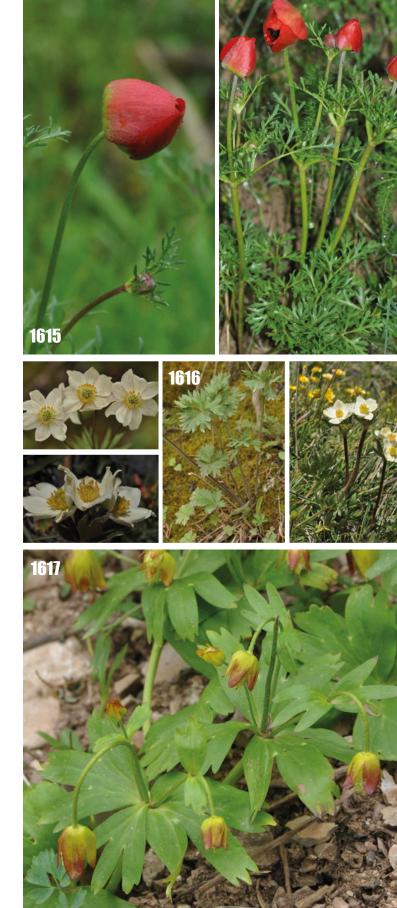
Habitat: Rocks, screes, nitrophilous rock footings

Elevational range: 1200 - 2000 Flowering period: IV to VI

Remarks: Cryptophyte; plant 6-8 (-10) cm high;

petals glabrous on both sides.

Usefulness: Orn.



















1618. Anemone tschernaewii (Czern.) Regel



Phytogeographical element: I-T

Habitat: Broad-leaved forests, xeric shrubs, thermophilous

Elevational range: 700 - 2200 Flowering period: III to IV

Remarks: Cryptophyte; plant 7-25 cm high; petals white, pink or purple; anthers linear-oblong, light or grayish

pink; filament of a stamen purple.

Usefulness: Orn.

1619. Aquilegia karelinii (Baker) O. Fedtsch. & B. Fedtsch.

Synonyms: Aquilegia vulgaris L. var. karelinii Baker



Phytogeographical element: NA

Habitat: Meadows, riverside forests, forbs

Elevational range: 1200 - 2800 Flowering period: V to VII

Remarks: Cryptophyte; plant stems glandular hairy, up to 80 cm high; leaflets lobed, deeply dissected, glabrous above, sparsely hairy beneath; flowers ca. 5 cm across, violet or dark red; sepals ovate, acuminate, glandularciliate; petals sparsely hairy, spur recurved; carpels 5, connate; styles glabrous.

1620. Aquilegia vicaria Nevski



Phytogeographical element: E, I-T Habitat: Rocks, screes, forbs, springs Elevational range: 1200 - 3500 Flowering period: VI to VII

Remarks: Cryptophyte; plant (10-)30-80 cm high; leaf petioles covered with scattered or numerous thin straight protruding hairs, sometimes with a slight admixture of

small glandular hairs. Usefulness: Orn.

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1621. Callianthemum alatavicum Freyn



Phytogeographical element: I-T, E-S

Habitat: Alpine swards, moraines and snow-beds

Elevational range: 3000 - 3400 Flowering period: VI to VII

Remarks: Cryptophyte; plant 5-18(-25) cm high; flowers

1.7–2.5 cm in diameter; petals 6–10.

1622. Ceratocephala testiculata (Crantz) Besser

Synonyms: Ranunculus testiculatus Crantz



Phytogeographical element: M, I-T

Habitat: Steppes, xeric shrubs, fields, ruderal

Elevational range: 350 - 2600 Flowering period: II to V

Remarks: Therophyte; plant 1–8 cm high; basal leaves 4–11; petiole 0.3–2 cm, sparsely arachnoid; flowers 6-9 mm in diameter; sepals long elliptic, 2.5-4.5 mm,

abaxially densely puberulent.

1623. Clematis asplenifolia Schrenk

Synonyms: Clematis songorica Bunge var. aspleniifolia (Schrenk) Trautv.



Phytogeographical element: I-T Habitat: River beds, screes Elevational range: 1600 - 3400 Flowering period: VI to VIII

Remarks: Chamaephyte; plant vines; leaves singular,

serrate, flowers whitish.





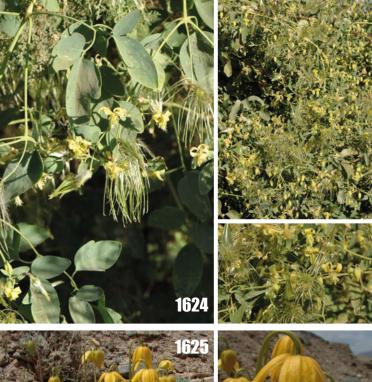


















1624. Clematis orientalis L.



Phytogeographical element: EI-T, E-S

Habitat: Forbs, scree Elevational range: 270 - 600 Flowering period: VI to IX

Remarks: Climber; plant vines; leaves 1- or 2-pinnate; cymes many flowered, flowers yellow, sepals adaxially

pubescent.

1625. Clematis tangutica (Maxim.) Korsh.

Synonyms: Clematis orientalis L. var. tangutica Maxim.



Phytogeographical element: EI-T Habitat: River beds, screes Elevational range: 3100 - 4300 Flowering period: VII to VIII

Remarks: Chamaephyte; woody vines, sometimes dwarf,

erect shrublets; pedicels 10-20 cm long.

Usefulness: Med, Orn.

1626. Consolida leptocarpa Nevski

Synonyms: Delphinium leptocarpum (Nevski) Nevski



Phytogeographical element: I-T

Habitat: Semi-deserts, salt marshes, steppes,

thermophilous shrubs Elevational range: 500 - 2300 Flowering period: IV to V

Remarks: Therophyte; plant 20–65 cm high; leaves pubescent, 2–3-sect, terminal lobules 1.2–2.5 mm wide; spur 3–4 mm wide at base; bracts shorter than flowers.

1627. Consolida rugulosa (Boiss.) Schrödinger

Synonyms: Delphinium rugulosum Boiss.



Phytogeographical element: I-T Habitat: Semi-deserts, steppes Elevational range: 400 - 1000 Flowering period: IV to VI

Remarks: Therophyte; plant 10-35 cm high; ovary pubescent, follicle 12-20 mm long, adjacent to stem;

flower spur 17–20 mm long.

1628. Coptidium lapponicum (L.) Gand. ex Rydb.

Synonyms: Ranunculus altaicus Laxm.



Phytogeographical element: EI-T, E-S Habitat: Fens, alpine meadows Elevational range: 2500 - 4000 Flowering period: VII to IX

Remarks: Cryptophyte; plant 10-15 cm high; stem brown puberulent only below flower; basal leaves glabrous with spatulate blade $1-2.5 \times 0.6-1.5$ cm; flowers solitary, 2.5 cm in diameter; receptacle densely puberulent; sepals 5 densely dark brown puberulent; petals obovate ca. $11 \times 8-11$ mm; achene glabrous.

1629. Delphinium barbatum Bunge

Synonyms: Aconitella barbata (Bunge) Soják, Consolida barbata (Bunge) Schrödinger



Phytogeographical element: I-T

Habitat: Steppes, thermophilous shrubs, forbs

Elevational range: 600 - 2300 Flowering period: VI to VII

Remarks: Therophyte; plant 30–60 cm high; carpels glabrous; flowers on long pedicels longer than perianth; pedicels with yellow hairs; sepals pale blue, hairy at

margins.





























1630. Delphinium biternatum Huth



Phytogeographical element: I-T

Habitat: Juniper forests, steppes, xeric shrubs,

thermophilous shrubs, forbs Elevational range: 1500 - 3600 Flowering period: VI to VII

Remarks: Cryptophyte; plant 40-100 cm high;

ovary and fruits pubescent. Usefulness: Med, Orn.

1631. Delphinium brunonianum Royle



Phytogeographical element: EI-T

Habitat: Rocks, screes

Elevational range: 3500 - 4900

Flowering period: VIII

Remarks: Cryptophyte; plant (20–)35–50 cm high; leaves distinctly funnel-shaped, cuneate at base; fruit 7–12 mm

long, 5–6 mm wide, bent downwards.

Usefulness: Orn.

1632. Delphinium confusum Popov



Phytogeographical element: I-T

Habitat: Juniper forests, screes, xeric shrubs

Elevational range: 2400 - 2600 Flowering period: VII to VIII

Remarks: Cryptophyte; plant 30–76(–90) cm high; inflorescence rather dense; leaf lobes do not overlap each

other in lower part. Usefulness: Orn.

1633. Delphinium decoloratum Ovcz. & Kochk.



Phytogeographical element: E, I-T

Habitat: Screes

Elevational range: 1400 - 1800 Flowering period: VI to VII

Remarks: Cryptophyte; plant 60–85 cm high; spur with a small hump at the base; pedicel 5–17 mm long; staminodes densely pubescent; basal leaves densely hairy.

Usefulness: Orn.

1634. Delphinium iliense Huth

Synonyms: Delphinium turkestanicum Huth



Phytogeographical element: I-T Habitat: Screes, xeric shrubs Elevational range: 800 - 1900 Flowering period: VII to VIII

Remarks: Cryptophyte; plant stem up to 80 cm high; proximal leaves usually not withered; raceme 6–20 cm, 5–12-flowered; pedicels 1–3.2 cm, glabrous; spur 1.4–1.7 cm, base 2.5–3.5 mm in diameter; petals emarginate, glabrous; filaments glabrous.

1635. Delphinium karategini Korsh.



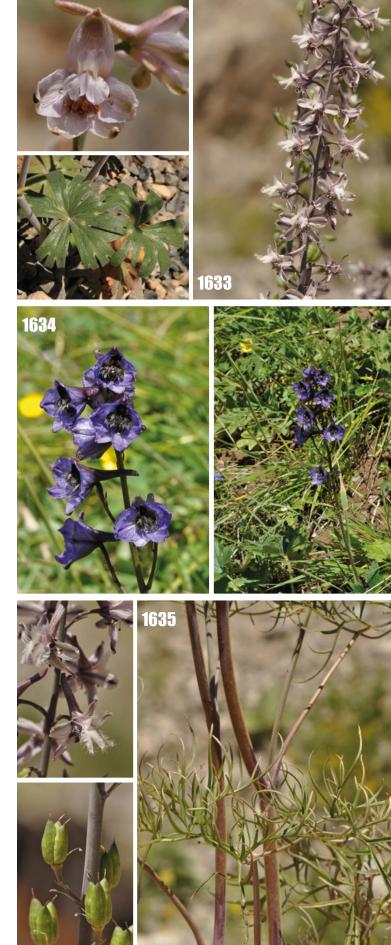
Phytogeographical element: E, I-T

Habitat: Juniper forests, steppes, thermophilous shrubs

Elevational range: 1500 - 2000 Flowering period: V to VII

Remarks: Cryptophyte; plant 50–80(–150) cm high; leaves shortly pubescent, 3–4-sect, cut into linear acute segments; pedicels slightly hairy; staminodes white.

Usefulness: Orn.













1636. Delphinium lipskii Korsh.



Phytogeographical element: E, I-T Habitat: Thermophilous shrubs Elevational range: 1500 - 2600 Flowering period: VI to VIII

Remarks: Cryptophyte; plant 60–75 cm high; spur not humped at base, obtuse at apex; pedicel 15–50 mm long, carpels hairy; basal leaves present during blooming; leaves 2–5(–6) cm, mainly in lower part of the stem; inflorescens loose, branching.

Usefulness: Orn.

1637. Delphinium longipedunculatum Regel & Schmalh.



Phytogeographical element: E, I-T

Habitat: Steppes, thermophilous shrubs, forbs

Elevational range: 500 - 1000 Flowering period: V to VI

Remarks: Cryptophyte; plant 35-70 cm high; leaves die

during flowering; leaflets glabrous.

Usefulness: Orn.

1638. Delphinium oreophilum Huth

Synonyms: Delphinium nevskii Zak.



Phytogeographical element: I-T

Habitat: Juniper forests, riverside forests, screes, forbs

Elevational range: 2000 - 4000

Flowering period: VII

Remarks: Cryptophyte; plant 30–70 cm high; leaves round in the outline, in lower part leaf lobes partly overlap each

other; staminodes dark brown.

Usefulness: Orn.

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1639. Delphinium semibarbatum Bien, ex Boiss.



Phytogeographical element: I-T Habitat: Thermophilous shrubs, forbs Elevational range: 600 - 1700

Flowering period: V to VI

Remarks: Cryptophyte; plant 35-75 cm high; ovary and

fruits glabrous. Usefulness: Orn.

1640. Eranthis longistipitata Regel

Synonyms: Shibateranthis longistipitata (Regel) Nakai



Phytogeographical element: I-T

Habitat: Juniper forests, steppes, xeric shrubs,

thermophilous shrubs, forbs Elevational range: 750 - 2000 Flowering period: III to IV

Remarks: Cryptophyte; plant 5–25 cm high; flowers developed gynophore; leaves all basal; inflorescence with

an involucre.

1641. Halerpestes sarmentosa (Adams) Kom.

Synonyms: Ranunculus sarmentosus Adams



Phytogeographical element: I-T, E-S

Habitat: Fens and mires, salt marshes, water bodies

Elevational range: 2300 - 4000 Flowering period: VI to VIII

Remarks: Cryptophyte; plant 2–9 cm high with stolons 10–20 cm long; leaf blade oblong-ovate to rounded ovate or rounded-reniform, base obtuse; sepals glabrous.





















1642. Nigella bucharica Schipcz.



Phytogeographical element: E, I-T Habitat: Fields, steppes, forbs Elevational range: 520 - 2500 Flowering period: V to VI

Remarks: Therophyte; plant 5–25(–50) cm high; perianth

12-15 mm long.

1643. Nigella integrifolia Regel



Phytogeographical element: I-T Habitat: Thermophilous shrubs, forbs

Elevational range: 500 - 1700

Flowering period: IV

Remarks: Therophyte; plant 5-25 cm high; perianth

(8-)10-12 mm long.

1644. Paraquilegia caespitosa (Boiss. & Hohen.) J.R. Drumm. & Hutch.

Synonyms: *Isopyrum caespitosum* Boiss. & Hohen.



Phytogeographical element: I-T

Habitat: Rocks, screes

Elevational range: 1850 - 4100 Flowering period: VII to VIII

Remarks: Cryptophyte; plant 5–8 (–10) cm high; scapes and leaves densely glandular puberulous; leaves ternate.

1645. Paraquilegia uniflora (Aitch. & Hemsl.) J.R. Drumm. & Hutch.

Synonyms: Isopyrum uniflorum Aitch. & Hemsl.



Phytogeographical element: I-T

Habitat: Rocks, screes

Elevational range: 2500 - 4000 Flowering period: VI to VIII

Remarks: Cryptophyte; plant 5–20 cm high; leaves slightly

sectioned; fruits bend aside.

1646. Pulsatilla campanella Fisch. ex Krylov



Phytogeographical element: I-T, E-S Habitat: Alpine meadows, alpine steppes

Elevational range: 2400 - 4200 Flowering period: VI to VII

Remarks: Cryptophyte; plant 14-20 cm high; flowers up to

3 cm in diameter; petals folded at apex.

1647. Ranunculus alajensis Ostenf.



Phytogeographical element: E, I-T

Habitat: Fens and mires, moraines and snow-beds

Elevational range: 2400 - 4500 Flowering period: V to VIII

Remarks: Cryptophyte; plant (2–) 8–18(–25) cm high, glabrous or only slightly hairy; achenes glabrous,

2-3 mm long.













1648. Ranunculus albertii Regel & Schmalh.

Synonyms: Ranunculus sulphureus Sol. var. albertii Maxim.



Phytogeographical element: EI-T Habitat: Fens and mires Elevational range: 3700 - 4300 Flowering period: VII to VIII

Remarks: Cryptophyte; plant 5–30 cm high; leaves glabrous, blades of basal leaves broader than long; sepals abaxially yellowish puberulent; flower solitary, terminal, 1.7–2.8 cm in diameter; carpels and achenes glabrous.

1649. Ranunculus arvensis L.



Phytogeographical element: I-T, M, E-S

Habitat: Ruderal, fields Elevational range: 700 - 2800 Flowering period: IV to VII

Remarks: Therophyte; plant 6–15(–50) high; basal leaves sparsely puberulent; leaves except the lowest deeply lobed; sepals patent; achene with spine up to 2 mm.

1650. Ranunculus aureopetalus Kom.

Synonyms: Ranunculus sciatrophus Ovcz.



Phytogeographical element: E, I-T Habitat: Juniper forests, steppes Elevational range: 2200 - 3300 Flowering period: V to VII

Remarks: Cryptophyte; plant 10–15(–25) cm high; nutlets glabrous; leaves oval–cordate, deeply 3–5 dissected.

1651. Ranunculus badachschanicus Ovcz. & Kochk.



Phytogeographical element: EI-T

Habitat: Alpine semi-deserts, alpine steppes

Elevational range: 2300 - 4500 Flowering period: V to VIII

Remarks: Cryptophyte; plant 10–25 cm high; flowers 2.5–2.8 cm in diameter; pedicels hairy; petals broadly ovate; thickening of roots brown-greyish; achenes hairy.

1652. Ranunculus baldshuanicus Regel ex Kom.



Phytogeographical element: I-T

Habitat: Juniper forests, broad-leaved forests, xeric shrubs,

thermophilous shrubs Elevational range: 450 - 2200 Flowering period: IV to VII Remarks: Cryptophyte; plant

50–85 cm high; flowers 14–22 mm in diameter; sepals abaxially densely yellowish pubescent; anthers filaments

pubescent.

1653. Ranunculus distans D. Don

Synonyms: Ranunculus brevirostris Edgew., R. laetus Wall.



Phytogeographical element: I-T, Himal

Habitat: Meadows, forbs Elevational range: 800 - 2600 Flowering period: V to VIII

Remarks: Cryptophyte; plant 22–65 cm high; basal leaves up to 7–8 cm wide, 3-partite, cordate at base, hirsute; receptacle glabrous; achenes ca. 2.2 mm long.









1654. Ranunculus kamchaticus DC.

Synonyms: Ficaria glacialis Fisch. ex DC., Oxygraphis glacialis (Fisch. ex DC.) Bunge



Phytogeographical element: I-T, E-S, Arctic Habitat: Fens and mires, moraines and snow-beds

Elevational range: 4000 - 4500 Flowering period: V to VII

Remarks: Cryptophyte; plant stemless, 5–10 cm high; leaves all basal, ovate, broadly ovate, or elliptic; flowers 1.5–3 cm in diameter; sepals persistent during fruiting.

1655. Ranunculus longicaulis Ledeb. ex A. Spreng.

Synonyms: Ranunculus pulchellus C.A. Mey. var. longicaulis Trautv.



Phytogeographical element: I-T, E-S

Habitat: Fens and mires

Elevational range: 2300 - 4000 Flowering period: VII to VIII

Remarks: Cryptophyte; plant 20–37 cm high; lower stem leaves lanceolate longer than basal ovoid lanceolate leaves; flowers 0.7–1(–1.6) mm in diameter; with five often

underdeveloped petals nearly equal to sepals.

1656. Ranunculus muricatus L.



Phytogeographical element: Plurireg

Habitat: Orchards and gardens, ruderal, fields

Elevational range: 500 - 1100

Flowering period: IV

Remarks: Therophyte; plant 15-40 cm high; nutlets with

spikes; leaves ovate, 3-pinnate.

1657. Ranunculus natans C.A. Mey.



Phytogeographical element: I-T, E-S

Habitat: Rivers, fens and mires, water bodies

Elevational range: 2600 - 4300 Flowering period: VII to VIII

Remarks: Cryptophyte; plant aquatic; achenes glabrous.

1658. Ranunculus paucidentatus Schrenk



Phytogeographical element: I-T

Habitat: Alpine meadows, pastures, forbs

Elevational range: 1000 - 3500 Flowering period: V to IX

Remarks: Cryptophyte; plant (10–)20–30(–40) cm high, densely covered with long white hairs; achenes up to

3 mm long, hairy, with a hooked tip.

1659. Ranunculus pinnatisectus Popov



Phytogeographical element: I-T

Habitat: Steppes, thermophilous shrubs, forbs

Elevational range: 400 - 1400 Flowering period: III to V

Remarks: Cryptophyte; plant 15–35 cm high; stems leafy; leaves 1 to 2-pinnate; achenes thinly hairy, 3–4 mm long.





















1660. Ranunculus popovii Ovcz.



Phytogeographical element: EI-T, Himal Habitat: Alpine meadows, fens, alpine swards

Elevational range: 2300 - 4500 Flowering period: VII to IX

Remarks: Cryptophyte; plant 4–16 cm high; basal leaves puberulent with blade 3-partite, rarely 3-lobed; flowers terminal 0.9–1.5 cm in diameter; sepals 3–5 mm abaxially densely yellowish pubescent; achene slightly compressed.

1661. Ranunculus pseudohirculus Schrenk

Synonyms: Ranunculus longicaulis Ledeb. ex A. Spreng. var. pseudohirculus (Schrenk) Gubanov, R. pulchellus C.A. Mey. var. pseudohirculus (Schrenk) Trautv.



Phytogeographical element: I-T Habitat: Fens and mires Elevational range: 2300 - 4400 Flowering period: VI to VIII

Remarks: Cryptophyte; plant 15–25 cm high; stem leaves shorter than basal; blades of basal leaves ovate or narrowly obovate, 0.5–1.2 cm wide, base broadly cuneate

or rounded; flowers 1.6-2.5 cm in diameter.

Usefulness: For.

1662. Ranunculus rubrocalyx Regel ex Kom.



Phytogeographical element: I-T

Habitat: Fens and mires, moraines and snow-beds

Elevational range: 2000 - 4500 Flowering period: VII to IX

Remarks: Cryptophyte; plant 10–20(–25) cm high; flowers 1–1.8 cm in diameter; calyx reddish-browny, pubescent.

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Ranunculaceae

1663. Ranunculus rufosepalus Franch.



Phytogeographical element: I-T

Habitat: Alpine meadows, fens and mires

Elevational range: 2700 - 4900 Flowering period: VII to X

Remarks: Cryptophyte; plant 10–20 cm high; sepals ovate, densely covered with reddish-brown to reddish hairs on

the outer surface.

1664. Ranunculus sceleratus L.



Phytogeographical element: Plurireg

Habitat: River beds, fields Elevational range: 430 - 800 Flowering period: IV to IX

Remarks: Therophyte, hemicryptophyte; plant 10–75 cm high; flowers 0.4–0.8 cm in diameter; pedicel 0.5–1.5 cm, glabrous or sparsely puberulent; achene slightly bilaterally

compressed.

1665. Ranunculus sewerzowii Regel

Synonyms: Ranunculus leptorrhynchus Aitch. & Hemsl.



Phytogeographical element: E, I-T Habitat: Juniper forests, steppes Elevational range: 500 - 2400 Flowering period: IV to V

Remarks: Cryptophyte; plant 25–30(–60) cm high; nutlets

ciliate on edge; lower leaves double 3-pinnate.







1665





















1666. Ranunculus subrigescens Ovcz.



Phytogeographical element: E, EI-T Habitat: Alpine meadows, fens and mires

Elevational range: 3600 - 4300 Flowering period: VI to VII

Remarks: Cryptophyte; plant 3–11 cm high; leaves palmate lobed, thick; pedicels and sepals hairy; flowers 1–2,

1.5-2 cm in diameter.

1667. Ranunculus tenuilobus Regel ex Kom.



Phytogeographical element: I-T

Habitat: Juniper forests, broad-leaved forests, xeric shrubs,

torbs

Elevational range: 800 - 2500 Flowering period: IV to VI

Remarks: Cryptophyte; plant 25–35(–57) cm high; stems covered with long protruding hairs; fruits small, round, 0.8–1 cm long; achenes 2.5–3 mm long with scattered

hairs.

1668. Ranunculus trautvetterianus C. Regel ex Ovcz.



Phytogeographical element: SE, I-T

Habitat: River beds, juniper forests, steppes

Elevational range: 2500 - 4000 Flowering period: VI to VII

Remarks: Cryptophyte; plant 6–20(–30) cm high; basal leaf blades up to 4 cm wide, base truncate-cuneate or cordate-truncate, 3-lobed, central lobe obovate or cuneate; flowers

2-2.7 cm in diameter; receptacle hairy.

1669. Ranunculus turkestanicus Franch.



Phytogeographical element: E, I-T

Habitat: Alpine meadows, steppes, moraines and snow-

beds, forbs

Elevational range: 2000 - 4000 Flowering period: VI to VIII

Remarks: Cryptophyte; plant 2-12(-19) cm high; leaves only basal; achenes with a dark strip; plant surrounded by numerous young individuals growing from short

vegetative stolones.

1670. Thalictrum alpinum L.



Phytogeographical element: Plurireg

Habitat: Fens and mires Elevational range: 3300 - 4200

Flowering period: VII

Remarks: Cryptophyte; plant 5–20 cm high; inflorescence a simple raceme; leaves all basal; leaflets cuneate-obovate

to orbicular-ovate. Usefulness: For.

1671. Thalictrum foetidum L.



Phytogeographical element: I-T, E-S, M Habitat: Fens and mires, springs Elevational range: 2000 - 4500

Flowering period: VII

Remarks: Cryptophyte; plant 20-40 cm high; stigma broadly winged, triangular; achenes laterally compressed,

shortly hairy.











1672. Thalictrum isopyroides C.A. Mey.



Phytogeographical element: I-T, E-S, M

Habitat: Juniper forests, steppes, thermophilous shrubs,

forbs

Elevational range: 400 - 3000 Flowering period: III - VII

Remarks: Cryptophyte; plant 25–40 cm high, glabrous; leaves present mainly in the lower part of the stem.

1673. Thalictrum kuhistanicum Ovcz. & Kochk.



Phytogeographical element: E, I-T

Habitat: Juniper forests, broad-leaved forests, xeric shrubs,

forbs

Elevational range: 1000 - 3100 Flowering period: V to VI

Remarks: Cryptophyte; plant (30–)50–80 cm high, glabrous or only sparsely hairy on leaflets and petioles;

leaves without stipules.

1674. Thalictrum sultanabadense Stapf



Phytogeographical element: I-T Habitat: Juniper forests, screes, forbs Elevational range: 800 - 2000

Flowering period: III to V

Remarks: Cryptophyte; plant 15–35 cm high; achenes

crescent-like.

1675. Trollius altaicus C.A. Mey.



Phytogeographical element: I-T, E-S Habitat: Fens, alpine swards Elevational range: 1500 - 3100 Flowering period: VII to VIII

Remarks: Cryptophyte; plant 20-30 cm high at flowering, elongated to 70 cm at fruiting; flower solitary, 3–5 cm across; sepals (10-)15–18, orange, 1.6- 2.5×0.9 -2 cm, rounded; styles dark purple or black; follicles ca. 16, ca. 1 cm \times 3.5 mm.

1676. Trollius komarovii Pachom.



Phytogeographical element: I-T

Habitat: Riverside forests, fens and mires

Elevational range: 2600 - 3500 Flowering period: VI to VII

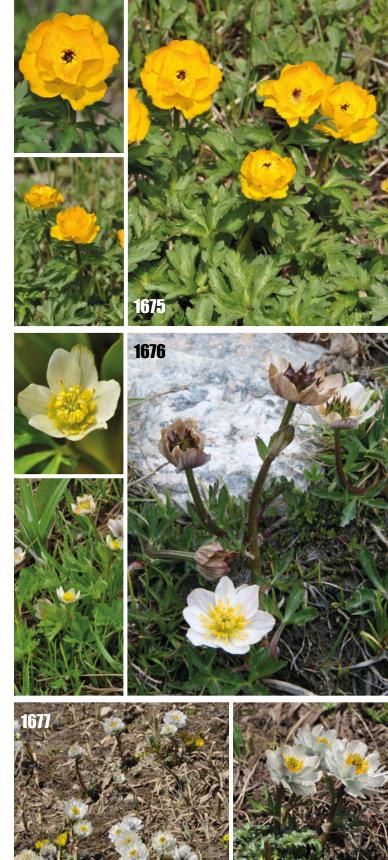
Remarks: Cryptophyte; plant stems more than 5 cm high, up to 24 cm at fruiting; petals equaling filaments; flower solitary, terminal; sepals ca. 6 mm, persistent.

1677. Trollius lilacinus Bunge



Phytogeographical element: EI-T, E-S Habitat: Fens, alpine swards Elevational range: 2600 - 3600 Flowering period: VII to IX

Remarks: Cryptophyte; plant 5–10 cm high, to 30 cm at fruiting; flower solitary, 2.5–3.5 cm in diameter; sepals 15–18, lilac-blue or pale blue, rarely white with blue veins, 1.2–1.6 cm \times 5.5–14 mm; petals ca. 8, broadly linear, shorter than stamens 5–6 \times 1.2–1.5 mm.









1678. Reseda bucharica Lity.

Synonyms: Reseda hemithamnoides Czerniak.



Phytogeographical element: I-T Habitat: Loose sandy screes, screes Elevational range: 750 - 1400 Flowering period: V to VI

Remarks: Cryptophyte; plant 40-70 cm high; sepals at

fruiting time absent; all leaves entire.

1679. Reseda lutea L.



Phytogeographical element: I-T, E-S, M Habitat: Ruderal, fields, steppes, xeric shrubs,

thermophilous shrubs Elevational range: 1500 - 1900 Flowering period: V to VII

Remarks: Therophyte, hemicryptophyte; plant 30–90 cm high; leaves 3–5-parted or pinnatifid; flowers yellow or yellowish green; sepals and petals usually 6; capsule

5-lobed at the apex. Usefulness: For, Foo.

1680. Rhamnus coriacea Brouss, ex Schult.



Phytogeographical element: E, I-T Habitat: Rocks, screes, xeric shrubs Elevational range: 1300 - 2800

Flowering period: IV

Remarks: Nanophanerophyte; shrub 100–150 cm tall, spinose; leaves very small, alternate or fascicled on short shoots; drupe dark brown or black at maturity, globose.

Usefulness: Orn.

1681. Rhamnus minuta Grubov



Phytogeographical element: SE, I-T

Habitat: Rocks

Elevational range: 2800 - 4200 Flowering period: VI to VII

Remarks: Nanophanerophyte; shrub 10–25 cm tall, spinose, profusely shortly branched; leaves very small, alternate or fascicled on short shoots; drupe yellow or

dark brown at maturity, obovoid-globose.

Usefulness: Foo.

1682. Ziziphus jujuba Mill.



Phytogeographical element: I-T, M Habitat: Thermophilous shrubs Elevational range: 650 - 1600 Flowering period: V to VII

Remarks: Megaphanerophyte; tree 3–14 m high; annual branches usually 2–7-fascicled on oblong reduced branches; pedicels and calyx glabrous; drupe oblong or

narrowly ovoid, mesocarp thick, fleshy.

Usefulness: Med, Foo, Orn.

1683. Agrimonia eupatoria L. subsp. asiatica (Juz.) Skalický

Synonyms: Agrimonia asiatica Juz.



Phytogeographical element: I-T, E-S, M, Orient

Habitat: Broad-leaved forests, riverside forests, ruderal,

forbs

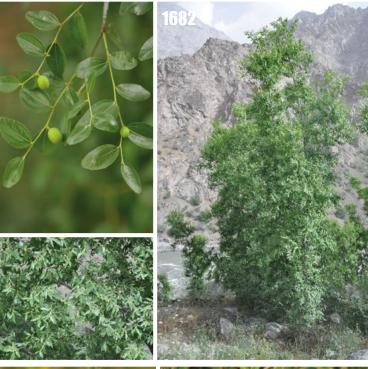
Elevational range: 600 - 2000 Flowering period: V to VII

Remarks: Cryptophyte; plant 0.35–1.2 m high; flowers 1.2–1.3 cm in diameter; fruiting hypanthium $8–10\times ca.5$ mm including prickles, outer prickles

recurved, innermost ones spreading.

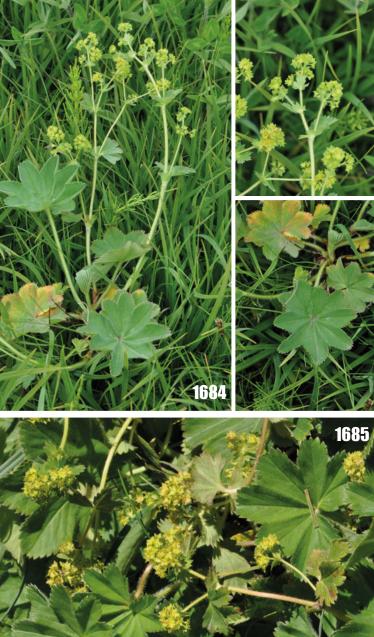
Usefulness: Med.













1684. Alchemilla hissarica Ovcz. & Koczk.



Phytogeographical element: I-T Habitat: Fens and mires Elevational range: 900 - 2800 Flowering period: V to VII

Remarks: Cryptophyte; plant 20–30 cm tall; stipules membranous, brown, glabrous; leaf blade cordate-orbicular, pubescent, margin 8–11 lobed and serrulate; hypanthium glabrous.

1685. Alchemilla obtusa Buser



Phytogeographical element: E-S, M, I-T Habitat: Alpine meadows, alpine swards

Elevational range: 1800 - 3000 Flowering period: VI to VIII

Remarks: Cryptophyte; plant medium-sized, gray-green; leaf blade rounded-reniform, $3-11 \times 4-13$ cm, with 9-11 lobes, margin serrulate, adaxially glabrous, abaxially hairy only on major veins and margin; inflorescences narrow, long, flowers in loose, $3 \times 3-4$ mm fascicle.

1686. Amygdalus bucharica Korsh.

Synonyms: Prunus bucharica (Korsh.) B. Fedtsch. ex Rehder



Phytogeographical element: SE, I-T Habitat: Thermophilous shrubs Elevational range: 800 - 2300 Flowering period: II to III

Remarks: Megaphanerophyte; tree between 3 and 10 m high; leaves broadly ovate, 3–6 × 2–2.5 cm; flowers 2.5–4.5 cm in diameter, pink or raspberry-red; endocarp

usually smooth.

Usefulness: Med, Foo, Ind, Orn.

1687. Cerasus tianshanica Pojark.

Synonyms: Microcerasus prostrata (Labill.) M. Roem. var. tianschanica (Pojark.) Eremin & Juschev



Phytogeographical element: I-T

Habitat: Xeric shrubs, thermophilous shrubs

Elevational range: 900 - 2300 Flowering period: IV to VI

Remarks: Nanophanerophyte; shrub up to 1.5 m high; leaf blade obovate to oblanceolate, 0.8–1.6 cm, glabrous; pedicel ca. 1.5 mm; flowers solitary, opening at same time as leaves; hypanthium longer than wide; style villous basally.

1688. Comarum salesovianum (Stephan) Asch. & Graebn.

Synonyms: Farinopsis salesoviana (Stephan) Chrtek & Soják



Phytogeographical element: I-T Habitat: River beds, rocks, screes Elevational range: 2600 - 4200 Flowering period: VII to VIII

Remarks: Chamaephyte; subshrub 30–100 cm high; sepals purplish, triangular-ovate, ca. 1.5 cm, abaxially pubescent; petals white or red, obovate, nearly equaling sepals, glabrous.

Usefulness: For, Foo, Orn.

1689. Cotoneaster hissaricus Pojark.

Synonyms: Cotoneaster racemiflorus (Desf.) K. Koch var. hissaricus (Pojark.) Kitam.



Phytogeographical element: I-T

Habitat: Juniper forests, broad-leaved forests, xeric shrubs

Elevational range: 1000 - 2200 Flowering period: V to VI

Remarks: Nanophanerophyte; shrub 0.7 up to 1.5–2 m high; leaves 1–3.7(–4.5) cm, sparse tomentose on abaxial surface, at the end of vegetation season nearly glabrous; inflorescence with 4–12 flowers, slightly hairy; fruits black with gray waxy cover, spherical.

Usefulness: Orn.















1690. Cotoneaster nummularioides Pojark.



Phytogeographical element: I-T

Habitat: Broad-leaved forests, thermophilous shrubs

Elevational range: 650 - 3000 Flowering period: IV to V

Remarks: Nanophanerophyte; shrub 1.5–2.75 m high; leaves small, 0.5–1(–2) cm, tomentose on abaxial surface; inflorescence compact, with (2–)3–5(–7) flowers,

tomentose; fruits violet-red, 6–8 mm long.

1691. Cotoneaster nummularius Fisch. & C.A. Mey.



Phytogeographical element: I-T

Habitat: Juniper forests, xeric shrubs, thermophilous

shrubs, forbs

Elevational range: 1400 - 3200 Flowering period: V to VI

Remarks: Nanophanerophyte; shrub small, 25–30 cm, rarely up to 1 m high; leaves small, 0.5–1.2 cm on generative shoots, 2 cm on vegetative shoots; inflorescence with

(2–)3–5(–7) flowers; fruits 6–8 mm long.

1692. Cotoneaster songaricus (Regel & Herder) Popov



Phytogeographical element: I-T

Habitat: Screes

Elevational range: 1500 - 3000 Flowering period: VI to VII

Remarks: Nanophanerophyte; shrub 1–2.5 m high; leaf blade apically obtuse, on abaxial surface white tomentose; hypanthium tomentose; petals 2.5–3.5 mm; fruit ovoid to ellipsoid.

cmpsoid

666

1693. Crataegus altaica (Loud.) Lage



Phytogeographical element: I-T, E-S Habitat: River beds, riverside forests Elevational range: 1500 - 3000 Flowering period: VI to VII

Remarks: Megaphanerophyte; tree medium-sized, 3–6 m high; leaves deeply pinnate to more than 1/2 width of blade, glabrous or slightly pubescent; fruits golden-yellow,

8–10 mm in diameter, pyrenes 4 or 5.

Usefulness: Foo.

1694. Crataegus azarolus L. var. pontica (K. Koch) K.I. Chr.

Synonyms: Crataegus pontica C. Koch



Phytogeographical element: I-T, M

Habitat: Broad-leaved forests, steppes, thermophilous

shrubs

Elevational range: 800 - 2000

Flowering period: V

Remarks: Megaphanerophyte; tree 4–8(–15) m high; leaves $5-7 \times 4-7$ cm; peduncle and pedicel strongly hairy; fruits

2.5-3 cm in diameter, yellow, fleshy.

Usefulness: Foo, Orn.

1695. Dasiphora dryadanthoides Juz.



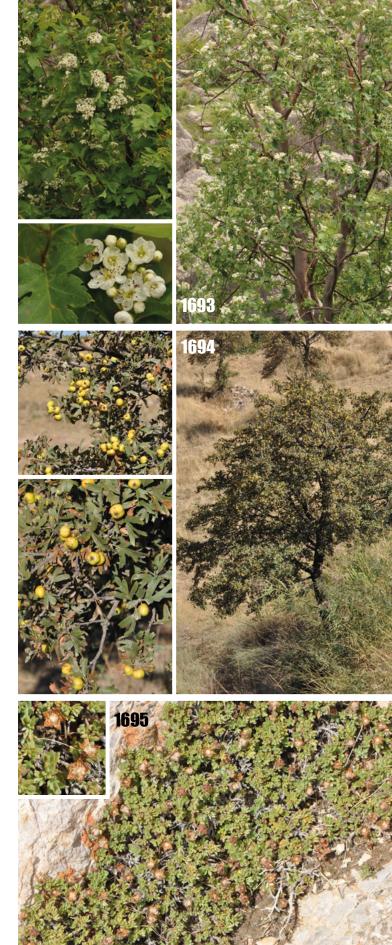
Phytogeographical element: EI-T

Habitat: Rocks, screes

Elevational range: 3400 - 4700 Flowering period: VII to VIII

Remarks: Chamaephyte; plant prostrate up to 3–12 cm high; young stems softly pubescent; leaves up to 1.5 cm with 3–7 leaflets; leaflets elliptic, abaxially slightly pubescent with entire margin; stipules reddish-brownish;

flowers up to 2 cm in diameter, solitary.





1696. Dasiphora phyllocalyx Juz.

Synonyms: Pentaphylloides phyllocalyx (Juz.) Soják



Phytogeographical element: EI-T

Habitat: Rocks, moraines, fens, alpine meadows

Elevational range: 2200 - 3600 Flowering period: VI to VIII

Remarks: Chamaephyte; plant prostrate 5–20 cm high; leaves pinnate, 0.5–1.5 cm long; leaflets elliptical or lanceolate; inflorescence terminal, with solitary flower;

flowers 2–3 cm in diameter.

1697. Duchesnea indica (Jacks.) Focke



Phytogeographical element: A, I-T, M, I-I, Orient, Tropic

Habitat: Ruderal

Elevational range: 800 - 1250 Flowering period: V to VII

Remarks: Cryptophyte; plant with stolons 30–100 cm long; plant spreading hairy or densely villous; leaflets obovate to rhombic-oblong, $1-5 \times 1-3$ cm, margin obtusely serrate, apex rounded; flowers 1–2.5 cm in diameter; sepals ovate; epicalyx segments longer than sepals, apex usually 3–5-serrate; petals yellow; aggregate fruit red, shining, 1–2 cm in diameter, spongy.

1698. Exochorda racemosa (Lindl.) Rehder

Synonyms: Exochorda alberti Regel, E. korolkowii Lavall.



Phytogeographical element: E, I-T Habitat: Broad-leaved forests, forbs Elevational range: 1200 - 2500 Flowering period: IV to VI

Remarks: Nanophanerophyte; shrubs up to 3 m high; leaf blades mostly entire, occasionally serrate at apex; petiole 0.5–1.5 cm or nearly absent; pedicels 3–5 mm; petals with

short claws; stamens 15-20.

Usefulness: Orn.

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1699. Geum kokanikum Regel & Schmalh.



Phytogeographical element: I-T

Habitat: Alpine meadows, screes, xeric shrubs, forbs

Elevational range: 1100 - 3400 Flowering period: VI to VII

Remarks: Cryptophyte; plant up to 70 cm high; flowers 1.5 cm in diameter; achenes 4–10, up to 8 mm long,

without hooks.

1700. Geum urbanum L.

Synonyms: Geum rivale L. subsp. urbanum (L.) Á. Löve & D. Löve



Phytogeographical element: I-T, E-S, M

Habitat: Broad-leaved forests, riverside forests, springs

Elevational range: 1400 - 2200 Flowering period: V to VI

Remarks: Cryptophyte; plant up to 85 cm high; stems hairy; flowers 0.8–1.2 cm in diameter; sepals roughly equal to petals or longer; petals yellow; achenes with long

hooks.

1701. Potentilla agrimonioides M. Bieb.

Synonyms: Potentilla agrimonioides var. malacotricha (Juz.) Soják, P. malacotricha Juz.



Phytogeographical element: E, I-T

Habitat: River beds, pastures, alpine steppes

Elevational range: 3800 - 4700 Flowering period: VI to VIII

Remarks: Cryptophyte; plant up to 10–25 cm high; plant covered with long, protruding hairs with an admixture of small yellowish glands; leaves silky, yellowish-white with 3–4 pairs of leaflets; leaflets overlapping each other; flowers up to 1.5 cm in diameter; achenes with scattered glands.

















1702. Potentilla algida Soják

Synonyms: Potentilla sericata Th. Wolf



Phytogeographical element: SE, I-T

Habitat: Juniper forests, steppes, xeric shrubs, forbs

Elevational range: 2300 - 3900 Flowering period: V to X

Remarks: Cryptophyte; plant 10–30(–55) cm high; leaves on long petioles, palmate; leaflets 4–7, oblong-lanceolate, covered by silky villose hairs; flowers up to 2.5 cm in

diameter.

1703. Potentilla anserina L.



Phytogeographical element: I-T, E-S, M

Habitat: Fens and mires, littoral vegetation, springs

Elevational range: 1900 - 4000 Flowering period: V to VIII

Remarks: Cryptophyte; plant stoloniferous, up to (3.5–) 15–30 cm long; basal leaves 2–20 cm including petiole, pinnate, abaxially densely appressed silvery sericeous, rarely glabrescent; leaflets serrate at margin; pedicels

without scalelike bracts. Usefulness: Med, Foo.

1704. Potentilla arnavatensis (Th. Wolf) Th. Wolf ex Juz.

Synonyms: Potentilla desertorum Bunge



Phytogeographical element: I-T

Habitat: Juniper forests, alpine meadows, rocks, steppes

Elevational range: 2100 - 4000 Flowering period: VII to VIII

Remarks: Cryptophyte; plant 20–40 cm high; basal leaves 5-nate, digitate, upper 3–5-nate; petioles 5–15 cm long; leaflets 1.5–8.5 cm long, obovate-cuneate, truncate, obtusely serrate, densely pilose with red (rarely white)

glands; flowers 1-1.5 cm. in diameter.

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1705. Potentilla biflora Willd, ex Schltdl.



Phytogeographical element: Plurireg

Habitat: Alpine meadows, alpine steppes, forbs

Elevational range: 2900 - 3000

Flowering period: VII

Remarks: Chamaephyte; plant tufted 4–12 cm high; flowering stems erect; leaf blade pinnately or subpalmately 5–7-foliolate; leaflets not articulate at base, margins entire; flowers usually 1 or 2, 1.2–1.8 cm in diameter.

1706. Potentilla chrysantha (Zoll. & Moritzi) Trevir.

Synonyms: Potentilla asiatica (Th. Wolf) Juz.



Phytogeographical element: I-T

Habitat: Broad-leaved forests, screes, steppes, xeric shrubs, forbs

10105

Elevational range: 1500 - 3600 Flowering period: VI to IX

Remarks: Cryptophyte; plant 40–50 cm high; flowering stems and petioles pubescent, glabrescent; plants with leaf rosettes at anthesis; basal leaves palmately or pedately 5-foliolate, rarely some leaves 3-foliolate or pinnate, abaxially green, pilose; flowers 1.5–2.5 cm in diameter.

1707. Potentilla conferta Bunge



Phytogeographical element: I-T, E-S

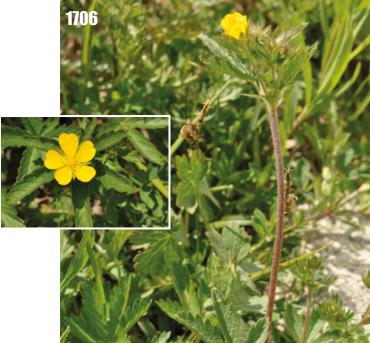
Habitat: Riverside forests, screes, fields, steppes

Elevational range: 2100 - 2500 Flowering period: VI to VII

Remarks: Cryptophyte; plant 4–45 cm high; plants sparsely covered by white villous hairs 3–4 mm; basal leaves pinnate; leaflets usually lobed, lobes triangular-oblong or triangular-lanceolate to fasciated oblong; flowers usually 1.2–1.5 cm in diameter; sepals erect, enlarged after

flowering.













1708. Potentilla crantzii (Crantz) Beck ex Fritsch

Synonyms: Potentilla gelida C.A. Mey.



Phytogeographical element: I-T, E-S, Himal Habitat: Fens and mires, alpine swards

Elevational range: 2200 - 3800 Flowering period: V - IX

Remarks: Cryptophyte; plant 10–20 cm high; flowering stems erect, ascending, or spreading, hairless or long pressed hairy; basal leaves 2.5–7 cm long including petiole, 3-foliolate; leaflets abaxially pilose or glabrescent; flowers 1–2 cm in diameter; calyx and pedicels with long protruding, somewhat sinuous hairs; anthers round ovate.

Usefulness: For.

1709. Potentilla flabellata Regel & Schmalh.



Phytogeographical element: E, I-T

Habitat: Alpine swards, loose sandy screes, moraines and

snow-beds

Elevational range: 3000 - 4200 Flowering period: VI - IX

Remarks: Cryptophyte; plant caespitose 5–12(–19) cm high; leaves ternate; petioles 1–4 cm long; leaflets irregularly and obtusely dissected, sparsely pilose to glabrescent; flowers

small, 6-8 mm diameter.

1710. Potentilla hololeuca Boiss, ex Lehm.



Phytogeographical element: I-T

Habitat: Juniper forests, screes, alpine steppes

Elevational range: 2500 - 4000 Flowering period: VI - VII

Remarks: Cryptophyte; plant 4–30 cm high; flowering stems tomentose and villous; basal leaves 2–6 cm including petiole; leaf blade pinnate with 2 pairs of leaflets; leaflets opposite, oblong to obovate-oblong, abaxially densely tomentose or villous, white tomentose on veins, adaxially pilose, margin pectinately lobed; inflorescence 3–7-flowered; flowers

1.5–2 cm in diameter.

1711. Potentilla kulabensis Th. Wolf



Phytogeographical element: E, I-T

Habitat: Broad-leaved forests, xeric shrubs, thermophilous

shrubs

Elevational range: 1100 - 2700 Flowering period: V - VI

Remarks: Cryptophyte; plant 15-40 cm high; basal leaves pinneate, 3-4(-5)-paired, upper tripartite; leaflets thin, deeply serrated, three upper larger than the rest, ovoid or broad-ovoid, pointed, adaxially green with sparse hairs; inflorescence 3–7-flowered; sepals long, at the apex with 2-3 separate lobes, silky-hairy; petals erect, dirty yellowish-white or yellow.

1712. Potentilla mollissima Lehm.



Phytogeographical element: E, I-T

Habitat: Broad-leaved forests, riverside forests, alpine

steppes, forbs

Elevational range: 1800 - 3200 Flowering period: VI - IX

Remarks: Cryptophyte; plant (25–)30 x 50(–70) cm high; basal leaves 5-palmate (upper undivided), soft, covered by silky villose hairs; flowers large, 2.5×3.0 cm diameter;

petals bright yellow.

1713. Potentilla pamiroalaica Juz.



Phytogeographical element: I-T Habitat: Alpine swards, alpine steppes Elevational range: 2900 - 4000 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 5-22 cm high; radical leaves 3–10 cm including petiole; leaf blade pinnate, with 3-5 pairs of leaflets; leaflets opposite or alternate, ovate or obovate-oblong, distal larger than proximal ones, adaxially green or grayish, abaxially densely white tomentose; inflorescence few flowered; flowers 1.2-1.5 cm

in diameter.









1712











1714. Potentilla parvifolia Fisch. ex Lehm.

Synonyms: Dasiphora parvifolia (Fisch. ex Lehm.) Juz., Pentaphylloides parvifolia (Fisch. ex Lehm.) Sojak



Phytogeographical element: I-T

Habitat: Rocks, screes

Elevational range: 1600 - 3000 Flowering period: VI - VII

Remarks: Nanophanerophyte; shrub 0.3–1.5 m high; leaves pinnate with 2 or 3 pairs of leaflets, basal 2 pairs usually palmately arranged, rarely leaves 3-foliolate; leaflets lanceolate, linear-lanceolate, or obovate-lanceolate, $5-10 \times 2-5$ mm, margin entire, base articulate at connection with petiole; petals yellow; ovary densely villous; style sub-basal.

1715. Potentilla reptans L.



Phytogeographical element: I-T, E-S

Habitat: River beds

Elevational range: 600 - 2100 Flowering period: V - VIII

Remarks: Cryptophyte; plant stoloniferous (8-)25-50(-100) cm long; radical leaves 7-12 cm including petiole, leaf blade pedately 5-foliolate, or 3-foliolate; leaflets obovate to obovate-oblong, abaxially pilose, rarely glabrescent, adaxially subglabrous; fowers

1.5-2.2 cm in diameter.

1716. Potentilla supina L.



Phytogeographical element: I-T, M, E-S, N Americ Habitat: River beds, riverside forests, fields

Elevational range: 1300 - 3100 Flowering period: IV - VII

Remarks: Therophyte, Cryptophyte; plant 20–50 cm high; flowering stems dichotomously branched; basal leaves 4-15 cm including petiole; leaf blade 3-foliolate or pinnate with 2-5 pairs of leaflets; leaflets alternate or opposite, oblong or obovate-oblong, up to 2.5 cm, pilose or glabrescent; flowers 6–8 mm in diameter.

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1717. Potentilla tephroleuca Th. Wolf



Phytogeographical element: SE, I-T Habitat: Alpine meadows, forbs Elevational range: 2900 - 3900 Flowering period: VII - IX

Remarks: Cryptophyte; plant 10–20 cm high; stems and petioles densely silky hairy; leaves on long petioles, usually 3-palmate; leaflets ovate or oblong, of approximately equal length, pilose; anthers elongate-ovate.

1718. Potentilla vvedenskyi Botsch.



Phytogeographical element: E, I-T

Habitat: Juniper forests, alpine meadows, alpine swards,

alpine steppes

Elevational range: 2900 - 3800 Flowering period: VI - VIII

Remarks: Cryptophyte; plant (5–)10–45 cm high; plant pale green, scattered hairy with glands; leaves 3-foliolate; leaflets broadly-ovoid, 0.8–1.8 cm long, on both sides green with pronounced veins; flowers up to 1.5 cm in diameter; achenes wrinkled.

1719. Prunus avium (L.) L.

Synonyms: Cerasus avium (L.) Moench



Phytogeographical element: Plurireg Habitat: Orchards and gardens, ruderal

Elevational range: 600 - 2100 Flowering period: IV - V

Remarks: Megaphanerophyte; trees to 25 m high; leaf blade obovate-elliptic to elliptic-ovate, $3-13 \times 2-6$ cm, petiole 2–7 cm, glabrous, apically with 2 nectaries; flowers opening at same time as leaves; drupe red to purplish black, subglobose to ovoid.

















1720. Prunus spinosissima (Bunge) Franch.

Synonyms: Amygdalus spinosissima Bunge



Phytogeographical element: I-T

Habitat: Screes, steppes, thermophilous shrubs

Elevational range: 400 - 1400 Flowering period: III - IV

Remarks: Nanophanerophyte; shrub 1-1.5(-2) m high; bark dark grey, strongly spinous; leaves $1.5-2.6 \times 0.3-0.5$ cm; flowers 6-8 mm in diameter, pink or purple-red; stamens 12-26; endocarp smooth or slightly wrinkled.

Usefulness: Ind.

1721. Prunus verrucosa Franch.

Synonyms: Cerasus verrucosa (Franch.) Nevski, Microcerasus prostrata (Labill.) M. Roem. var. verrucosa (Franch.) Eremin & Juschev



Phytogeographical element: I-T

Habitat: Steppes, thermophilous shrubs

Elevational range: 900 - 3500

Flowering period: IV

Remarks: Nanophanerophyte; shrub 0.5–3 m high; leaves on young shoots $1.1-1.2 \times 0.3-0.6$ cm, on older $3-5 \times 1.5-3$ cm, sparsely hairy during flowering, then glabrous on both sides; fruits small, $5-6(-10) \times 4-5(-8)$ mm.

Usefulness: Ind, Hou, Orn.

1722. Rosa bellicosa Nevski



Phytogeographical element: I-T

Habitat: Steppes, thermophilous shrubs

Elevational range: 1500 - 2000

Flowering period: V - VI

Remarks: Nanophanerophyte; shrub up to 1.5 m high; branchlets spreading; prickles dense, straight, flat; stem and leaves densely pubescent; leaflets elliptic, with glands on margins; hypanthium abaxially glandular hispid, with short prickles; petals 5, white-pink.

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1723. Rosa berberifolia Pall.

Synonyms: Hulthemia berberifolia (Pall.) Dumort.



Phytogeographical element: I-T Habitat: Fields, steppes Elevational range: 400 - 800 Flowering period: IV - V

Remarks: Nanophanerophyte; dwarf shrub 30–50 cm high; branchlets yellow, smooth when young, dark brown and rough when old, glabrous; prickles in pairs at leaf bases;

flower solitary; petals yellow.

Usefulness: Orn.

1724. Rosa ecae Aitch.



Phytogeographical element: I-T Habitat: Steppes, xeric shrubs Elevational range: 900 - 2500 Flowering period: IV - VII

Remarks: Nanophanerophyte; shrub up to 1 m high; branchlets spreading; prickles dense, straight, fine, firm, flat, tapering to an elliptic base; leaflets 5–7(–9), ovate, elliptic, or obovate, 1–2.2 × 0.6–1.3 cm, abaxially glandular or sparsely pubescent, adaxially glabrous or subglabrous; hypanthium subglobose, abaxially glabrous or glandular hispid; flowers up to 2.5 cm in diameter, petals 5, yellow; styles glabrous.

1725. Rosa fedtschenkoana Regel



Phytogeographical element: I-T

Habitat: Juniper forests, riverside forests, steppes

Elevational range: 1500 - 3200 Flowering period: VI - VII

Remarks: Nanophanerophyte; shrub up to 6 m high; leaves including petiole 3–4.5 cm; leaflets usually 7, rarely 5 or 9, suborbicular or ovate, glabrous; flowers 3–4 cm in diameter; petals white, rarely pink; oblong or ovoid, densely glandular- pubescent.















1726. Rosa gallica L.



Phytogeographical element: A, I-T, E-S, M Habitat: Orchards and gardens, ruderal

Elevational range: 500 - 1000 Flowering period: VI - VII

Remarks: Nanophanerophyte; shrub, up to 30–100 cm high; prickles curved, erect or hooked, often declining, with an admixture of glandular bristles; petiole and rachis with sparse pricklets, puberulent, glandular; leaflets 5(–7); inflorescences 1–3(–8)-flowered; hypanthium 5–7 × 3–5(–7) mm, neck (0–)1 × 3 mm; sepal tip 7 × 2 mm, erect or spreading; petals 2.7–3.5 × 2–3 cm; styles exsert 2–4 mm beyond hypanthium orifice.

1727. Rosa kokanica (Regel) Regel ex Juz.



Phytogeographical element: I-T

Habitat: Broad-leaved forests, xeric shrubs, thermophilous

shrubs

Elevational range: 1000 - 2500 Flowering period: V - VII

Remarks: Nanophanerophyte; shrub 1.5–2 m high; prickles dense, straight, fine, firm, flat, tapering to an elliptic base, intermixed with glandular hairs on young branches; branchlets spreading, straight, rough; leaflets abaxially glandular or sparsely pubescent, adaxially glabrous or subglabrous; hypanthium subglobose, abaxially glandular hispid, with short prickles, or glabrous; petals 5, yellow, up to 4.5 cm in diameter; styles densely pubescent.

1728. Rosa korschinskiana Boulenger



Phytogeographical element: E, I-T

Habitat: River beds, juniper forests, riverside forests, forbs

Elevational range: 1400 - 3400 Flowering period: VI - VIII

Remarks: Nanophanerophyte; shrub 2(–3) m high; twigs often flexuose; prickles straight, subulate, infrastipular, uniform or mixed with bristles, glandular acicles or stalked glands; leaflets 5–7(–9), 0.5–2.5 cm long; flowers with broad bracts, solitary or 3–5 in fascicles, 3–6 cm in diameter; sepals entire, erect or ascending in fruit; petals pink, red or rarely white; styles densely pubescent in compact head; orifice broad; hypanthium globose, ovoid or pyriform, red.

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1729. Rosa maracandica Bunge



Phytogeographical element: SE, I-T Habitat: Steppes, xeric shrubs Elevational range: 800 - 3200 Flowering period: V - VIII

Remarks: Nanophanerophyte; shrub up to 1 m high; stems climbing, with spikes up to 1.5 cm long; leaves up to 3 cm long with 5–7 leaflets; leaflets up to 1 cm long; inflorescences with 1 or rarely 4–5 flowers; flowers 3–4 cm in diameter; sepals up to 1.3 cm long, permanent.

1730. Rosa ovczinnikovii Kochk.



Phytogeographical element: SE, I-T

Habitat: Broad-leaved forests, riverside forests, forbs

Elevational range: 1200 - 3500 Flowering period: V - VI

Remarks: Nanophanerophyte; shrub up to 1.5(-2) m; prickles irregularly set on the stem, straight or curved, gradually dilated at base, sometimes mixed with acicles and stalked glands; leaflets $5-7(-9) \times 1.5(-2)$ cm long, usually abaxially pubescent, glandular, rarely smooth; flowers solitary, without bracts; petals yellow up to 1.5 cm long; sepals not dilated at apex, persistent; orifice wide; hypanthium up to 1.5 cm in diameter, globose or pyriform, violet-brown.

1731. Rubus caesius L.



Phytogeographical element: Plurireg Habitat: River beds, broad-leaved forests

Elevational range: 600 - 2900 Flowering period: V - X

Remarks: Nanophanerophyte; shrubs scandent, up to 1.5 m high; branchlets yellow-green to brownish, glaucous and with unequal long prickle; leaves ternately pinnately compound; inflorescences terminal or axillary, corymbose or short racemes, several to more than 10-flowered; petals white, broadly elliptic; fruit black, subglobose, ca. 1 cm in diameter.

ral or axillary, corymbose e than 10-flowered; petals k, subglobose, ca. 1 cm in

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1732. Rubus praecox Bertol.



Phytogeographical element: A, Plurireg

Habitat: Ruderal

Elevational range: 400 - 1600 Flowering period: IV - VII

Remarks: Cryptophyte; plant up to 1.5 m; leaflets 5, usually glabrous on adaxial surface, tomentose on abaxial; petiole and rachis puberulent; flowers gathered in a panicle; petals white or pink; stamens much longer than the carpel.

1733. Sanguisorba minor subsp. magnolii (Spach) Briq.

Synonyms: Poterium polygamum Desf.



Phytogeographical element: I-T, E-S

Habitat: Screes, steppes Elevational range: 1000 - 2500 Flowering period: V - VII

Remarks: Cryptophyte; plant 40–80 cm high; stems glabrous or hairy; radical leaf blade with 4–6(–17) pairs of leaflets; leaflets usually truncate to subcordate at base, $1.5-2 \times 0.5-1.5$ cm; inflorescence flowering from base to apex, compact, $10-14 \times 7-10$ mm; sepals white or pinkish;

stamens numerous (more than 4).

1734. Sibbaldia olgae Juz. & Ovcz.



Phytogeographical element: I-T Habitat: Alpine meadows, steppes Elevational range: 2000 - 4600 Flowering period: VI - VII

Remarks: Chamaephyte; shrub spreading, not forming dense moss-like cushions, mostly erect or ascendant-erect; leaves 3-foliolate, 2–3 cm long; leaflets obovate, with a rounded wedge-shaped base and 2–3-dentate apex, abaxial surface covered with adpressed hairs; inflorescence with 2–4 flowers; flowers bisexual, 5–6 mm in diameter; sepals 5; petals 5, mostly cream-white; achenes 1.8 mm long, smooth.

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1735. Sibbaldia tetrandra Bunge

Synonyms: Dryadanthe tetrandra (Bunge) Juz.



Phytogeographical element: I-T, E-S, Himal Habitat: Rocks, screes, alpine deserts Elevational range: 2700 - 4800 Flowering period: VI - VII

Remarks: Chamaephyte; plant 2-5 cm high; basal leaves palmately 3-foliolate; leaflets obovate-oblong, base cuneate, margin entire except for (2 or) 3-5-dentate apex; flowers 1(-3); petals 4, nearly equaling or slightly longer than sepals.

1736. Sibbaldianthe bifurca (L.) Kurtto & T. Erikss. subsp. orientalis (Juz.) Kurtto & T. Erikss.

Synonyms: Potentilla orientalis Juz.



Phytogeographical element: I-T, E-S, M

Habitat: Pastures, ruderal, fields, steppes, forbs

Elevational range: 900 - 3400 Flowering period: V - VIII

Remarks: Cryptophyte, Chamaephyte; plant 5-20 cm long; basal stem partly subterraneous, woody and creeping, upper stem slender and herbaceous, sparsely pilose; leaves with 3-8 approximate pairs, of leaflets; leaflets up to 2 cm, oblong-obovate to oblong-lanceolate, entire or 2-fid, densely to moderately pilose or glabrescent; inflorescence terminal; flowers 0.7-1.5 cm. diameter.

1737. Sorbus persica Hedl.



Phytogeographical element: I-T Habitat: Broad-leaved forests Elevational range: 1500 - 2200 Flowering period: V - X

Remarks: Megaphanerophyte; tree 6-12 m high; leaves 5.5-7 cm long and 3-6 cm wide, margin with shalow lobes, upper surface glabrous, lower white villous; flowers 10-15 mm in

diameter; fruits pink-red.











1738. Sorbus tianschanica Rupr.



Phytogeographical element: I-T

Habitat: Juniper forests, riverside forests

Elevational range: 2500 - 3000 Flowering period: VI - VII

Remarks: Megaphanerophyte; shrub or small tree up to 5 m high; leaves imparipinnate, together with rachis 14–17 cm long; stipules membranous, caducous; leaflets (4–)6 or 7 pairs, less than 10 cm long, rarely longer, glabrous on both surfaces, margin sharply serrate; inflorescence glabrous; fruit red or white tinged red.

Usefulness: Orn.

1739. Sorbus turkestanica (Franch.) Hedl.



Phytogeographical element: I-T Habitat: Juniper forests Elevational range: 1600 - 2900 Flowering period: V - IX

Remarks: Megaphanerophyte; tree 8-12 m high; leaves 10-11 cm long and 5-6 cm wide, margin deeply, up to 1/2 of leaf blade lobed, upper surface glabrous, lower white pubescent; flowers 15-16 mm in diameter.

1740. Spiraea baldshuanica B. Fedtsch.



Phytogeographical element: E, I-T

Habitat: Rocks, screes

Elevational range: 1100 - 2300 Flowering period: V - VII

Remarks: Nanophanerophyte; shrub up to 40-60 cm high; plant glabrous except sepals; leaves $0.8-2.5 \times 0.4-1.4$ cm, obovate, elliptical or lanceolate rarely wider, leaf margin at the top or almost from the middle serrated; inflorescence panicle; flowers 5-7 mm in diameter; petals white.

Usefulness: Orn.

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1741. Spiraea pilosa Franch.



Phytogeographical element: I-T

Habitat: Rocks, screes

Elevational range: 1400 - 2700 Flowering period: VI - VII

Remarks: Nanophanerophyte; shrub 30–70 cm high; plant hairy; leaves 0.5– 1.8×0.4 –1 cm, obovate, elliptical or lanceolate rarely wider, leaf margin at the top or almost from the middle serrated; inflorescence corymbose;

flowers up to 10 mm in diameter.

Usefulness: Orn.

1742. Spiraea tianschanica Pojark.



Phytogeographical element: SE, EI-T

Habitat: River bars, screes Elevational range: 1800 - 3300 Flowering period: V - VII

Remarks: Nanophanerophyte; shrub up to 1.5 m high; shoots terete, glabrous or puberulent; leaf blades $0.6-2 \times 0.2-2$ cm, margin entire or with a few crenate teeth near apex; inflorescences on short, lateral branchlets arising from branches of previous year; flowers in sessile umbels; petals white or rose.

Usefulness: Orn.

1743. Tylosperma lignosa (Willd. ex Schltdl.) Botsch.



Phytogeographical element: I-T

Habitat: Rocks

Elevational range: 1800 - 2200

Flowering period: VI

Remarks: Chamaephyte; plant up to 15 cm; stems woody with red-brown bark; leaves (1–)2–4 cm with 5 leaflets; leaflets round to obovate; flowers 1.2–1.5 cm in diameter; sepals 6×2 mm, ovoid-lanceolate; petals 8×5 mm,

obovate.















1744. Asperula albiflora Popov



Phytogeographical element: I-T

Habitat: Rocks

Elevational range: 1700 - 3200 Flowering period: V - VIII

Remarks: Chamaephyte; dwarf shrub, 15–40 cm high; corolla–tube 1.5 times longer than limb, white, glabrous.

1745. Asperula laevis Schischk.

Synonyms: Asperula oppositifolia Regel & Schmalh. subsp. pseudocynanchica Ehrend.



Phytogeographical element: I-T

Habitat: Rocks, screes

Elevational range: 1400 - 1800 Flowering period: VI - VIII

Remarks: Chamaephyte; dwarf shrub, 20–40 cm high;

corolla and fruit glabrous.

1746. Asperula oppositifolia Regel & Schmalh.



Phytogeographical element: I-T

Habitat: Rocks

Elevational range: 1400 - 3000 Flowering period: VI - X

Remarks: Chamaephyte; dwarf shrub, 15–35 cm high; stems glabrous; leaves pubescent, corolla and fruit pubescent; corolla–tube 2–3 times longer than limb.

1747. Asperula pauciflora Tschern.



Phytogeographical element: E, I-T

Habitat: Rocks

Elevational range: 1300 - 1900 Flowering period: V - VI

Remarks: Chamaephyte; dwarf shrub, 30–35 cm high; leaves opposite, stems glabrous, corolla and leaves

pubescent.

1748. Asperula setosa Jaub. & Spach



Phytogeographical element: I-T

Habitat: Juniper forests, screes, steppes, xeric shrubs, forbs

Elevational range: 1400 - 2800 Flowering period: V - VII

Remarks: Therophyte; plant 10–30 cm high; stem single,

erect; laves 4-8 in a whorl.

1749. Asperula trichodes J. Gay ex DC.

Synonyms: Leptunis trichodes (J. Gay) Schischk.



Phytogeographical element: I-T Habitat: River beds, steppes Elevational range: 800 - 1200 Flowering period: IV - V

Remarks: Therophyte; plant 8–20 cm high; leaves linear, 8–16 in a whorl in the lower and middle part of the stem.











1750. Callipeltis cucullaris (L.) DC.

Synonyms: Callipeltis cucullaris (L.) Stev.



Phytogeographical element: I-T, M Habitat: Screes, steppes Elevational range: 600 - 2500 Flowering period: IV - VI

Remarks: Therophyte; plant 5–20 cm high;

leaves glabrous and smooth.

1751. Crucianella exasperata Fisch. & C.A. Mey.



Phytogeographical element: I-T

Habitat: Steppes, thermophilous shrubs, forbs

Elevational range: 1500 - 2400 Flowering period: VI - VII

Remarks: Therophyte; plant 5–30 cm high;

corolla 2-3.5 mm, yellow-white.

1752. Crucianella gilanica Trin.

Synonyms: Crucianella glauca A. Rich. ex DC.



Phytogeographical element: I-T Habitat: Rocks, screes, steppes Elevational range: 700 - 2300 Flowering period: VI - VII

Remarks: Cryptophyte; plant 20-50 cm high; corolla

5–7 mm, pink or yellow-green.

1753. Cruciata pedemontana (Bellardi) Ehrend.

Synonyms: Galium pedemontanum (Bellardi) All., Valantia pedemontana Bellardi



Phytogeographical element: I-T

Habitat: Steppes

Elevational range: 550 - 1600 Flowering period: IV - V

Remarks: Therophyte; plant 15–25 cm high; stem and leaves hirsute; leaves $2-10 \text{ mm} \times 2-3 \text{ mm}$; corolla yellow.

1754. Galium aparine L.



Phytogeographical element: I-T, E-S, M

Habitat: River beds, broad-leaved forests, ruderal, fields, forbs

Elevational range: 350 - 2500 Flowering period: III - IV

Remarks: Therophyte; plant 30–100 cm; leaves 6–8 in a whorl; inflorescence axillary 1–3-flowered; fruit 2–5 mm in diameter, hairy, covered with dense hooked hairs or setae.

Usefulness: Med, For.

1755. Galium ghilanicum Stapf

Synonyms: Galium transcaucasicum Stapf., G. subreflexum Popov



Phytogeographical element: I-T

Habitat: Screes, steppes, xeric shrubs, thermophilous

shrubs

Elevational range: 400 - 1200 Flowering period: IV - V

Remarks: Therophyte; plant 5–30 cm; inflorescences narrowly thyrsoid, not diffuse and intricate, with fruiting pedicels only up to 4 mm; corolla white or greenish white;

fruit glabrous.























1756. Galium pamiroalaicum Pobed.

Synonyms: Galium pamiro-alaicum Pobed.



Phytogeographical element: I-T Habitat: Meadows, pastures, steppes Elevational range: 1300 - 3700 Flowering period: VI - VII

Remarks: Cryptophyte; plant 40–120 cm high; leaves

2–8 cm, 6–10 in a whorl; fruit glabrous.

1757. Galium spurium L.

Synonyms: Galium valantii DC.



Phytogeographical element: Plurireg Habitat: Rocks, screes, xeric shrubs Elevational range: 1200 - 3300 Flowering period: IV - VIII

Remarks: Therophyte; plant 10-50 cm high; stem flexuous,

leaves 6–8 in a whorl; fruit pubescent.

Usefulness: Med, For.

1758. Galium spurium L. subsp. ibicinum (Boiss. & Hausskn.) Ehrend.

Synonyms: Galium ibicinum Boiss. & Hausskn., Galium linczevskyi Pobed.



Phytogeographical element: SE, I-T

Habitat: River beds, loose sandy screes, screes, steppes

Elevational range: 2100 - 3200 Flowering period: IV - VI

Remarks: Therophyte; plant 3-7 cm high; stems erect;

leaves 4–8 in a whorl; fruit pubescent.

1759. Galium tenuissimum M. Bieb.



Phytogeographical element: I-T

Habitat: Rocks, screes, nitrophilous rock footings, fields

Elevational range: 1400 - 2100 Flowering period: V - VIII

Remarks: Therophyte; plant 10–50 cm high; leaves at middle stem region in whorls of 6–8, subsessile or sessile; blade linear to oblanceolate; corolla whitish, pale yellow,

or greenish.

1760. Galium tricornutum Dandy



Phytogeographical element: I-T, E-S, M

Habitat: Juniper forests, screes, fields, xeric shrubs,

thermophilous shrubs, forbs Elevational range: 500 - 2500 Flowering period: IV - VIII

Remarks: Therophyte; plant 10–60 cm high; leaves glabrescent above; fruit becoming pendulous on arching

peduncles and pedicels, verrucose to spinulose.

1761. Galium turkestanicum Pobed.



Phytogeographical element: I-T Habitat: Meadows, pastures, steppes Elevational range: 2200 - 3200

Flowering period: VI - VII

Remarks: Cryptophyte; plant 30-80 cm high; 4 leaves in

each whorl, fruit pubescent with hamate hairs.







1761























1762. Galium vassilczenkoi Pobed.



Phytogeographical element: E, I-T

Habitat: Broad-leaved forests, riverside forests, nitrophilous rock footings, xeric shrubs

Elevational range: 2000 - 3600 Flowering period: VI - VII

Remarks: Cryptophyte; plant 50–100 cm; hirsute due to downwards recurved bristles; leaves 4–5–6 in a whorl;

fruit hirsute.

1763. Galium verticillatum Danthoine ex Lam.



Phytogeographical element: I-T

Habitat: River beds, rocks, screes, steppes

Elevational range: 450 - 1800 Flowering period: IV - VI

Remarks: Therophyte; plant 5–30 cm high; stem erect;

leaves pendent; peduncles short and thick.

1764. Plocama asperuliformis (Lincz.) M. Backlund & Thulin

Synonyms: Gaillonia asperuliformis Lincz., Neogaillonia asperuliformis (Lincz.) Lincz.



Phytogeographical element: I-T

Habitat: Rocks, screes

Elevational range: 1700 - 3100

Flowering period: VIII

Remarks: Chamaephyte; dwarf shrub, 20–40 cm high; steam pubescent; corolla 3–4.5 mm, fruit densely and long

pubescent.

1765. Rubia chitralensis Ehrend.



Phytogeographical element: I-T Habitat: Screes, steppes Elevational range: 2300 - 3600 Flowering period: VI - VII

Remarks: Cryptophyte; plant 20–35 cm high; leaves 1–4 cm; corolla yellowish, with very short 0.5–0.7 mm

tube.

1766. Rubia tibetica Hook. f.



Phytogeographical element: I-T

Habitat: Rocks, screes

Elevational range: 2600 - 4500 Flowering period: VI - IX

Remarks: Chamaephyte; dwarf shrub, 5–25 cm high; stem scabrous above; leaves 2 or 3–4 in a whorl; corolla yellow-

green.

1767. Dictamnus albus L.

Synonyms: *Dictamnus albus* subsp. *turkestanicus* Wint., *D. angustifolius* G. Don fil. ex Sweet, *D. turkestanicus* (Wint.)

Popov



Phytogeographical element: I-T Habitat: Broad-leaved forests, forbs Elevational range: 1600 - 3000 Flowering period: VI - VIII Remarks: Cryptophyte; plant

30–90 cm tall; stem and branches pubescent, dark gland dotted; leaves opposite, 5–13-pinnate; pedicel long, densely glandular, patent hairy with stipitate glands;

flowers light-pink.









1768. Haplophyllum acutifolium (DC.) G. Don

Synonyms: *Haplophyllum perforatum* Kar. & Kir., *H. perforatum* (Bieb.) Kar. & Kir.



Phytogeographical element: I-T Habitat: Fields, steppes, forbs Elevational range: 350 - 3200 Flowering period: V - VI

Remarks: Cryptophyte; plant 25–70 cm high; petals 2.5–4 mm; stamen filaments joined, capsule glabrous.

1769. Haplophyllum dubium Korovin



Phytogeographical element: I-T

Habitat: Steppes

Elevational range: 700 - 1500 Flowering period: V - VII

Remarks: Cryptophyte; plant 15–50 cm high; leaves 3–dissected; stamen filaments almost free; ovary and

capsule pubescent.

1770. Haplophyllum griffithianum Boiss.

Synonyms: Haplophyllum foliosum Vved., H. leptomerum Lincz. & Vved., H. tenuisectum Lincz.



Phytogeographical element: I-T Habitat: Semi-deserts, steppes Elevational range: 500 - 1600 Flowering period: VI - VII

Remarks: Cryptophyte; plant 25-60 cm high; leaves entire;

petals 4–5 mm; capsule glandulousely pointed.

1771. Haplophyllum lasianthum Bunge

Synonyms: Haplophyllum versicolor Fisch. & C.A. Mey.



Phytogeographical element: I-T Habitat: Fields, steppes Elevational range: 400 - 1700 Flowering period: IV - VI

Remarks: Cryptophyte; plant 10–25 cm high; petals pale

yellow; on back side purple or greenish.

1772. Haplophyllum pedicellatum Bunge ex Boiss.



Phytogeographical element: I-T

Habitat: Semi-deserts, fields, salt marshes, steppes

Elevational range: 450 - 1700 Flowering period: IV - V

Remarks: Cryptophyte; plant 15–50 cm high, densely

hirsute.

1773. Populus alba L.

Synonyms: Populus bachofenii Wierzb. ex Rochel

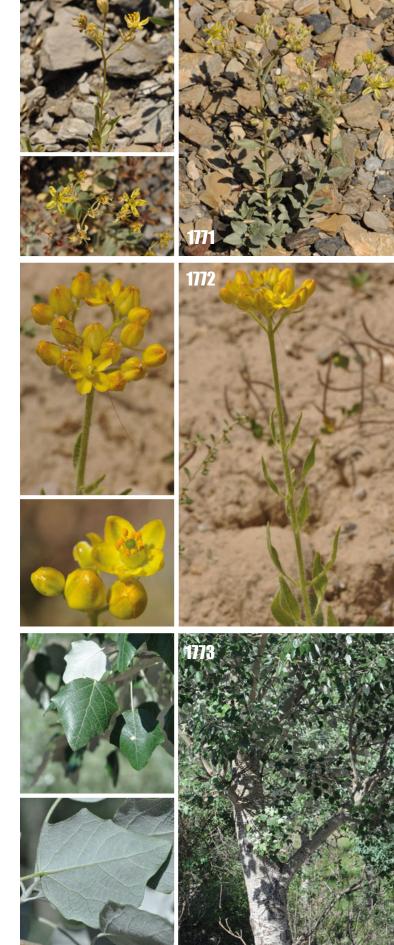


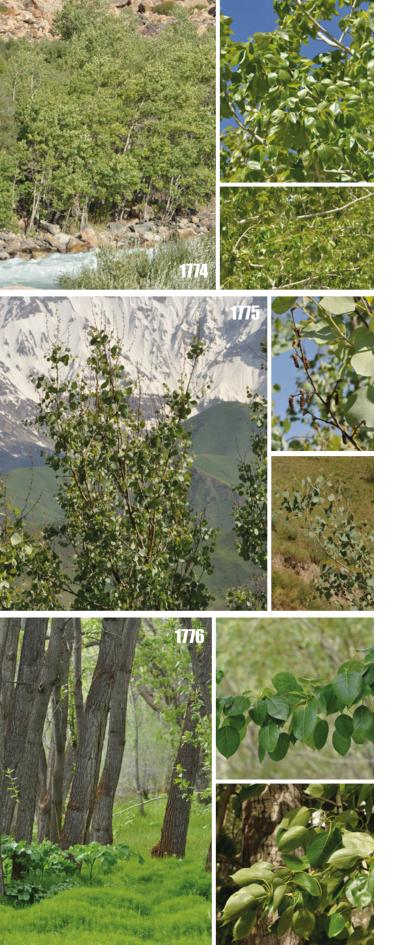
Phytogeographical element: Plurireg

Habitat: Riverside forests Elevational range: 750 - 2000 Flowering period: IV - VI

Remarks: Megaphanerophyte; tree up to 30 m tall; bark green-white; leaves of long shoots 3–5–palmately lobed, leaves of short branchlets and petioles abaxially densely

white tomentose.





1774. Populus pamirica Kom.



Phytogeographical element: SE, EI-T Habitat: River beds, riverside forests Elevational range: 800 - 2750 Flowering period: IV - V

Remarks: Megaphanerophyte; tree 15–25 m high; leaves of short branchlets with petiole terete, 3–7 cm, downy; leaf blade orbicular, 5–8 cm, abaxially greenish, slightly

pubescent along veins, adaxially green. Usefulness: Hou.

1775. Populus pruinosa Schrenk



Phytogeographical element: I-T Habitat: River beds, riverside forests Elevational range: 350 - 1950 Flowering period: IV - V

Remarks: Megaphanerophyte; tree up to 25(-35) m high;

leaves often reniform, entire. Usefulness: Hou, Orn.

1776. Populus talassica Kom.

Synonyms: Populus densa Kom.



Phytogeographical element: I-T Habitat: River beds, riverside forests Elevational range: 2000 - 3250 Flowering period: IV - V

Remarks: megaphanerophyte; tree up to 25 m high; leaves

 $5-8 \times 3-5$ cm, serrate-dentate, usually glabrous.

Usefulness: Hou, Orn.

1777. Populus tremula L.



Phytogeographical element: E-S, M, I-T

Habitat: Riverside forests Elevational range: 600 - 1800 Flowering period: III - VII

Remarks: megaphanerophyte; tree up to 30 m tall; bark green-grey; petiole compressed, ca. as long as leaf blade; leaf blade suborbicular, 3-7 cm, both surfaces glabrous, base truncate, rounded, or shallowly cordate, margin with remotely sinuous teeth or crenate, apex obtuse-rounded.

1778. Salix babylonica L.



Phytogeographical element: A, Plurireg

Habitat: River beds

Elevational range: 750 - 2400 Flowering period: III - IV

Remarks: Megaphanerophyte; tree up to 40 m high; branches long, pendent; petiole 3–5(–10) mm long, lamina $8-16 \times 0.8-1.5$ cm, narrowly elliptic to linear lanceolate, serrulate, acuminate, glabrous or with sparse adpressed hairs; male catkin 2.5–5 cm long; stamens 2,

1779. Salix coesia Vill.



Phytogeographical element: I-T, E-S Habitat: Meadows, fens and mires Elevational range: 3000 - 4200

Flowering period: IV - V

Remarks: Nanophanerophyte; plant 0.2-1 m high; juvenile 1–2(–3)-years branchlets olive, yellow-brown to dark red-brown, 3-5-years old branchlets pale yellow, old branchelets brown; petiole 2–5 mm long, lamina 10-35(-40) cm long $(2-4 \times longer than wide)$, tip obtuse or apiculate, bottom side differ than upper, glabrous.











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1780. Salix pycnostachya Andersson



Phytogeographical element: I-T

Habitat: River beds

Elevational range: 2000 - 4000 Flowering period: III - IV

Remarks: megaphanerophyte, nanophanerophyte; plant up to 10 m high; bracts up to 10 mm, lanceolate; leaves 8-20 mm wide; catkins 2-3 cm \times ca. 5 mm; peduncle ca.

1 cm, with 2 or 3 leaflets.

1781. Salix schugnanica Goerz



Phytogeographical element: I-T Habitat: Meadows, fens and mires Elevational range: 2300 - 4300 Flowering period: III - IV

Remarks: Nanophanerophyte; plant 0.3–1.5 m high; juvenile branchlets white, pilose, one year old branchlets brown or dull brown, glabrous; leaf exstipulate, petiole 2–3 mm long, lamina (linear)-lanceolate, obovate, silky tomentose on both sides or glabrous above, tip obtuse, mucronate; male catkin at anthesis 1.5–2.5 cm long; stamens 2, free or partly or completely united.

1782. Azolla filiculoides Lam.



Phytogeographical element: A, Plurireg

Habitat: Fields, aquatic vegetation, water bodies

Elevational range: 350 - 550 Flowering period: VI - VIII

Remarks: Therophyte; aquatic plant, 1–10 cm in diameter; upper lobe of leaf obtuse, with a broad membranous

margin.

1783. Thesium alatavicum Kar. & Kir.



Phytogeographical element: I-T Habitat: Meadows, xeric shrubs Elevational range: 2100 - 2500 Flowering period: V - VII

Remarks: Cryptophyte; plant 14–42 cm high; stem thin, erect; pedicel 2–9 mm long; nutlets 3–4.5 mm long,

1.5–2.5 mm wide, sessile or subsessile.

1784. Acer pentapomicum Stewart ex Brandis

Synonyms: Acer ovchinnikovii V. Zapr., A. pubescens Franch., A. regelii Pax, A. xerophilum Butk.



Phytogeographical element: I-T Habitat: Thermophilous shrubs Elevational range: 800 - 2200 Flowering period: III - VII

Remarks: megaphanerophyte; plant 6-8(-12) m high; leaves $5-6(-8) \times 7-8(-9)$ cm, 3-5-lobed, lobes triangular,

samaras glabrous 4(-5) cm long.

Usefulness: Orn.

1785. Acer platanoides L. subsp. turkestanicum (Pax) P.C. DeJong

Synonyms: Acer turkestanicum Pax



Phytogeographical element: I-T

Habitat: Broad-leaved forests, xeric shrubs, forbs

Elevational range: 1000 - 2800 Flowering period: IV - V

Remarks: megaphanerophyte; plant up to 15(-20) m high; leaves $8-10(-15)\times 13-15(-20)$ cm, 5(-7)- acute lobed,

samara 5-7(-9) cm long.

Usefulness: Orn.



















1786. Acer tataricum L. subsp. semenovii (Regel & Herder) A.E. Murray

Synonyms: Acer semenovii Regel & Herder, A. ginnala subsp. semenovii (Regel & Herder) Pax



Phytogeographical element: I-T Habitat: Juniper forests Elevational range: 800 - 1600

Flowering period: V

Remarks: megaphanerophyte; plant 3.5(-6) m high; leaf blade subleathery, $1.2-2.5 \times 1-3.2$ cm, 3- or 5-lobed, crenate or doubly serrate; samara wing pubescent, glandular when young.

1787. Chrysosplenium nudicaule Bunge



Phytogeographical element: EI-T, E-S, Himal

Habitat: Rocks, fens

Elevational range: 2200 - 3800 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 4.5–10 cm high; stems usually leafless; cyme dense, ca. 1.1 cm, subglabrous; bracteal leaves broadly ovate to flabellate, leathery, abaxially glabrous, adaxially sparsely brown pilose, shallowly 3–9-dentate; hypanthium brown pilose; capsule ca. 3.4 mm, apex retuse.

1788. Saxifraga cernua L.



Phytogeographical element: EI-T, Arctic, E-S

Habitat: Rocks, screes Elevational range: 4200 - 4900 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 6–25 cm high; rhizomes with bulbils; bulbils present in axils of cauline leaves and (where replacing flowers) bracts; basal leaves with petiole 3–8 cm, leaf blade reniform, margin generally 5-7-lobed, lobes broadly ovate, glandular pubescent; petals white.

Usefulness: For.

1789. Saxifraga hirculus L.



Phytogeographical element: I-T, E-S, Arctic

Habitat: Fens and mires Elevational range: 3100 - 4900 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 6.5-21 cm high; pedicels with brown, long, crisped, villous hairs; leaf blade elliptic, lanceolate, or oblong to linear-oblong, both surfaces glabrous, margin brown pilose or glabrous; petals yellow.

1790. Saxifraga oppositifolia L.



Phytogeographical element: I-T, E-S, Arctic Habitat: Rocks, screes, moraines and snow-beds

Elevational range: 3500 - 4500

Flowering period: VII

Remarks: Cryptophyte; plant ca. 6 cm high; shoots forming mats or cushions; shoot leaves opposite, with 3–7 chalk

glands; petals purple.

1791. Saxifraga sibirica L.



Phytogeographical element: I-T, E-S

Habitat: Alpine meadows, rocks, screes, nitrophilous rock

footings

Elevational range: 1700 - 4300 Flowering period: V - VIII

Remarks: Cryptophyte; plant 6.5–25 cm high; rhizomes with bulbils; bulbils restricted to rhizome, none present in axils of cauline leaves or bracts; basal leaves with petiole 1.2–4.5 cm, leaf blade reniform, margin 7–9-lobed, lobes ovate or broadly so to broadly orbicular, glandular pilose; petals white.











1792. Saxifraga stenophylla Royle



Phytogeographical element: I-T, Himal

Habitat: Alpine meadows, screes, alpine steppes, moraines

and snow-beds

Elevational range: 3400 - 4800 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 5–15.5 cm high; stem densely glandular hairy; basal leaves aggregated into a rosette, producing axillary, filiform stolons; petals yellow.

1793. Limosella aquatica L.



Phytogeographical element: Plurireg

Habitat: Fields, aquatic vegetation, water bodies

Elevational range: 1800 - 3200 Flowering period: VII - IX

Remarks: Therophyte; plant 1–10 cm high; corolla 2–3 mm, calyx 1.5–2.5 mm; corolla white or reddish,

2-3.5 mm; capsule ovoid, ca. 3 mm.

1794. Scrophularia fedtschenkoi Gorschk.



Phytogeographical element: E, I-T

Habitat: Screes

Elevational range: 2600 - 3800 Flowering period: VII - VIII

Remarks: Cryptophyte; plant up to 60 cm high; leaves dissected; calyx up to 2 mm long; corolla 4.5–5 mm long; lobes of upper lip 2 × longer than lobes of lower lip; stamen filament with scatterd glandular hairs, stamens

hidden inside a flower; staminode elliptic.

1795. Scrophularia heucheriiflora Schrenk ex Fisch. & C.A. Mey.



Phytogeographical element: I-T

Habitat: Juniper forests, broad-leaved forests, fields

Elevational range: 1600 - 2000 Flowering period: IV - V

Remarks: Cryptophyte; plant up to 80 cm high; stems covered with long straight glandular hairs; leaves entire, cordate or rounded at base; calyx 2.5–3 mm long; corolla 4–5 mm long; lobes of upper lip more or less equal to lateral lobes of lower lip; stamen filament with scatterd glandular hairs; staminode elliptic, 2 × longer than wide.

1796. Scrophularia pamirica Ivanina



Phytogeographical element: E, EI-T Habitat: River beds, rocks, screes Elevational range: 3700 - 4000 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 20–40 cm high; leaves entire, oblong-lanceolate, cuneate at base; calyx up to 2 mm long, glabrous or with scattered glandular hairs at base; corolla 6–8 mm long; lobes of upper lip dark red 1.5–2 × longer than lateral paler lobes; stamen filament with glandular hairs, stamens protruding outside a flower; staminode lanceolate.

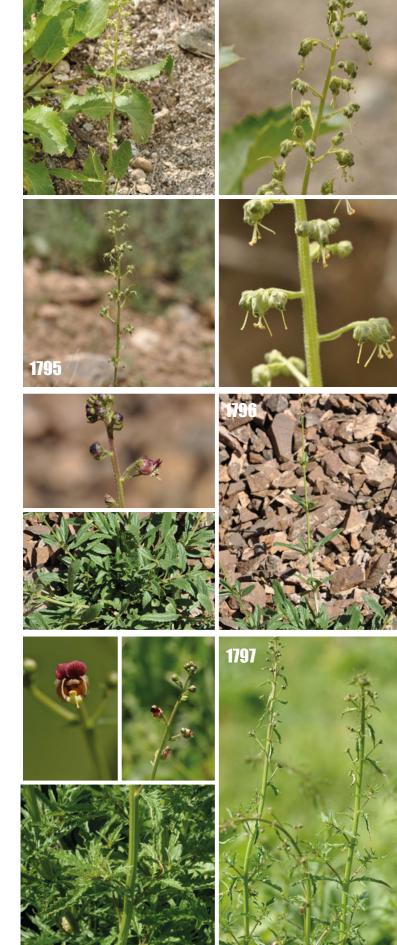
1797. Scrophularia pamiro-alaica Gorschk.



Phytogeographical element: E, I-T Habitat: Steppes, xeric shrubs Elevational range: 2300 - 3500 Flowering period: VI - VII

Remarks: Cryptophyte; plant 45–70 cm high, glabrous; leaves cuneate at base; calyx up to 4 mm long; corolla up to 6 mm long; lobes of upper lip equal or $1.5 \times$ longer than lateral lobes of lower lip; stamen filament covered with glandular hairs, stamens hidden inside a flower;

staminode round.





1798. Scrophularia scabiosifolia Benth.



Phytogeographical element: I-T

Habitat: Rocks, loose sandy screes, screes

Elevational range: 400 - 1900 Flowering period: III - IV

Remarks: Cryptophyte; plant 20–60 cm high; leaves dissected; calyx 2–2.5 mm long, glabrous or sometimes with scatterd glandular hairs; corolla 3–4 mm long; lobes of upper lip almost as long as lobes of lower lip; stamen filament with glandular hairs, stamens protruding outside a flower; staminode oblong or triangular.

1799. Scrophularia tadshicorum Gontsch.



Phytogeographical element: I-T Habitat: Juniper forests, steppes, forbs Elevational range: 1400 - 2400

Flowering period: V - VI

Remarks: Cryptophyte; plant up to 1 m high; stems dansely covered with glandular hairs in upper part and slightly in lower part; leaves oblong or elliptic-oblong, cordate at base; inflorescence leafy, pyramidal, oblong; calyx lobes linnear-lanceolate; staminode absent.

1800. Verbascum blattaria L.



Phytogeographical element: I-T, M, E-S Habitat: Ruderal, fields, steppes

Elevational range: 350 - 1700 Flowering period: V - IX

Remarks: Therophyte, hemicryptophyte; plant 40–140 cm high; glabrous in lower part and glandulose in the upper;

corolla 2-3 cm in diameter; anthers 5.

1801. Verbascum erianthum Benth.

Synonyms: Verbascum bactrianum Bunge



Phytogeographical element: I-T

Habitat: River beds, loose sandy screes, screes

Elevational range: 350 - 2700 Flowering period: VI - IX

Remarks: Hemicryptophyte; plant 50–150 cm high; densely villous; lower leaves petiolate, 5–16 cm; middle stem leaves sessile, much shorter than lower leaves; corolla

1.5–2.5 cm; stamens 5.

1802. Verbascum songaricum Schrenk

Synonyms: Verbascum polystachyum Kar. & Kir.



Phytogeographical element: I-T

Habitat: River beds, riverside forests, rocks, loose sandy

screes, screes

Elevational range: 700 - 2600 Flowering period: V - VIII

Remarks: Hemicryptophyte; plant 45–150 cm high, densely stellate hairy; glandular hairs absent; stem leaves adaxially not green; calyx 6–10 mm long; capsule 5–8 mm long, wide elliptic-ovoid, shorter or equal to calyx; anthers reniform, the same in all stamens.

Tankalmana, Mad

Usefulness: Med.

1803. Datura stramonium L.



Phytogeographical element: Plurireg Habitat: River beds, ruderal, fields Elevational range: 400 - 2400 Flowering period: V - VIII

Remarks: Therophyte; plant 25–100 cm high; corolla 6–10(–12) cm long, white or purplish; capsule erect, 3–5 cm long, ovoid, spiny and densely pubescent, splitting

by 4 valves; spines up to 5 mm long.





















1804. Hyoscyamus niger L.



Phytogeographical element: Plurireg Habitat: River beds, ruderal, fields Elevational range: 800 - 3100 Flowering period: IV - V

Remarks: Therophyte, hemicryptophyte; plant up to 1 m high; pubescent throughout with sticky glandular hairs; fruiting calyx urceolate, lobes mostly erect; flowers 2–3 cm; corolla campanulate, twice as long as calyx. Usefulness: Med.

1805. Hyoscyamus pusillus L.



Phytogeographical element: I-T

Habitat: River beds, loose sandy screes, screes, fields, xeric

shrubs, forbs

Elevational range: 500 - 3800 Flowering period: IV - VI

Remarks: Therophyte; plant 10–30 cm high; prostrate or erect, branched or unbranched near base, mostly glandular pubescent, sometimes glabrescent; fruiting calyx tubular–funnelform, lobes spreading; flowers 1–1.5 cm; corolla funnelform, slightly exceeding calyx.

1806. Lycium depressum Stocks



Phytogeographical element: I-T

Habitat: Steppes

Elevational range: 500 - 800 Flowering period: IV - VII

Remarks: Nanophanerophyte; plant 1.5–2.5 m high, glabrous; corolla glabrous, stamens glabrous; berries red.

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Solanaceae

1807. Lycium ruthenicum Murray



Phytogeographical element: I-T, E-S Habitat: Salt shrubs, steppes Elevational range: 350 - 2300 Flowering period: IV - VI

Remarks: Nanophanerophyte; plant up to 1.8 m high; shoots greyish to white, glabrous; throat of corolla pubescent; base of filaments pubescent; berries black.

Usefulness: Med.

1808. Nicotiana rustica L.



Phytogeographical element: A, I-T, Americ S

Habitat: Fields

Elevational range: 400 - 1350 Flowering period: VII - IX

Remarks: Therophyte; plant 40-60(-120) cm high; corolla tubular, greenish yellow, less than 2.5 cm long; stamens

included.

Usefulness: Med, Hou.

1809. Physalis angulata L.

Synonyms: Physalis hermanni Dunal



Phytogeographical element: I-I, I-T

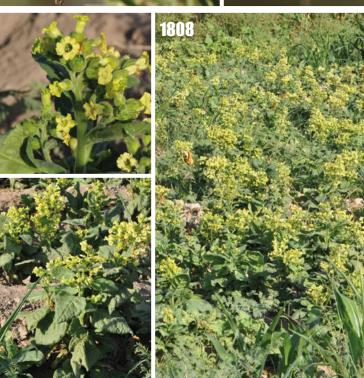
Habitat: Fields

Elevational range: 400 - 800 Flowering period: X

Remarks: Therophyte; plant annual, 30-50 cm high; calyx

at fruting time green.











1810. Solanum nigrum L.

Synonyms: Solanum americanum Mill.



Phytogeographical element: Plurireg

Habitat: Orchards and gardens, ruderal, fields

Elevational range: 400 - 2000 Flowering period: VI - X

Remarks: Therophyte; plant up to 100 cm high, pubescent; leaf blade ovate, cuneate at base; fruiting pedicels strongly

deflexed; berry dull black, globose.

1811. Sphenoclea zeylanica Gaertn.



Phytogeographical element: I-T, I-I, Afryk, Austral

Habitat: Fields

Elevational range: 600 - 900 Flowering period: VIII - IX

Remarks: Therophyte; plant 20–70 cm high, glabrous; leaf blade elliptic-lanceolate or ovate-lanceolate, margin entire; flowers densely crowded, arranged in spikes 1–5 cm long; calyx 5-lobed, lobes ovate-orbicular; capsule 2–4 mm in

diameter.

1812. Myricaria bracteata Royle

Synonyms: Myricaria alopecuroides Schrenk, M. germanica (L.) Desv. var. alopecuroides (Schrenk ex Fisch. & C.A. Mey.) Maxim.



Phytogeographical element: I-T

Habitat: River beds

Elevational range: 1100 - 3900 Flowering period: V - VIII

Remarks: Nanophanerophyte; plant 1–2 m high; inflorescences usually terminal, or both terminal and axillary, base with or without imbricate scales.

Usefulness: Foo, Orn.

1813. Myricaria squamosa Desv.

Synonyms: *Myricaria germanica* (L.) Desv. var. *squamosa* (Desv.) Maxim.



Phytogeographical element: I-T Habitat: River beds

Elevational range: 2500 - 4000 Flowering period: VII - VIII

Remarks: Nanophanerophyte; plant 1–2 m high; inflorescences lateral, or several clustered and axillary, base with numerous persistent imbricate scales.

Usefulness: Med, Orn.

1814. Reaumuria alternifolia (Labill.) Britten

Synonyms: Reaumuria turkestanica Gorschk.



Phytogeographical element: I-T Habitat: Semi-deserts, salt marshes

Elevational range: 400 - 600 Flowering period: V - VII

Remarks: Cryptophyte; plant 20–80 cm tall; stem branched in the upper part, glabrous; leaves $1.5-4.5 \times 0.7-1$ cm,

lanceolate-ovate; petals 0.8-1.4 cm.







1815. Reaumuria kaschgarica Rupr.



Phytogeographical element: EI-T Habitat: Semi-deserts, screes, steppes Elevational range: 1100 - 2200 Flowering period: VII - IX

Remarks: Nanophanerophyte; plant up to 25 cm high; leaves 4–10 mm long; stamens 15(–18), capsule oblong-

ovoid.

1816. Reaumuria soongarica (Pall.) Maxim.



Phytogeographical element: EI-T Habitat: Semi-deserts, screes, steppes Elevational range: 850 - 1950 Flowering period: VII - IX

Remarks: Nanophanerophyte; plant 10–30(–70) cm high; leaves 1–5 mm long; stamens 6–8(–12) cm; capsule

narrowly ellipsoid or fusiform.

1817. Tamarix florida Bunge



Phytogeographical element: I-T

Habitat: River beds, salt shrubs, steppes

Elevational range: 500 - 1500

Flowering period: IV - VI

Remarks: Nanophanerophyte; plant up to 3 m high; lateral racemes on growing branches of previous year and racemes on branches of current year, forming a terminal panicle; petals deciduous; bracts shorter than calyx.

1818. Tamarix hispida Willd.



Phytogeographical element: I-T

Habitat: River beds, riverside forests, salt shrubs

Elevational range: 300 - 800 Flowering period: IX - XI

Remarks: Nanophanerophyte; plant 1.5–3 m high; young branches densely hispid; racemes terminal on branches of current year, clustered into terminal, large, dense panicles; leaves grayish, densely puberulous; bracts subequaling or

exceeding calyx; petals spreading.

Usefulness: Med.

1819. Tamarix ramosissima Ledeb.

Synonyms: Tamarix pentandra Pall.



Phytogeographical element: I-T, M, E-S

Habitat: River beds, riverside forests, salt shrubs

Elevational range: 350 - 2900 Flowering period: VI - IX

Remarks: Nanophanerophyte; plant 1–3 m high; racemes terminal on branches of current year, clustered into terminal panicles; bracts equaling or exceeding calyx; corolla cupshape; petals persistent after anthesis, without keel.

1820. Diarthron vesiculosum (Fisch. & C.A. Mey.) C.A. Mey.

Synonyms: Passerina vesiculosa Fisch. & C.A. May.



Phytogeographical element: I-T, E-S, M Habitat: River beds, fields, steppes Elevational range: 400 - 3600 Flowering period: V - VIII

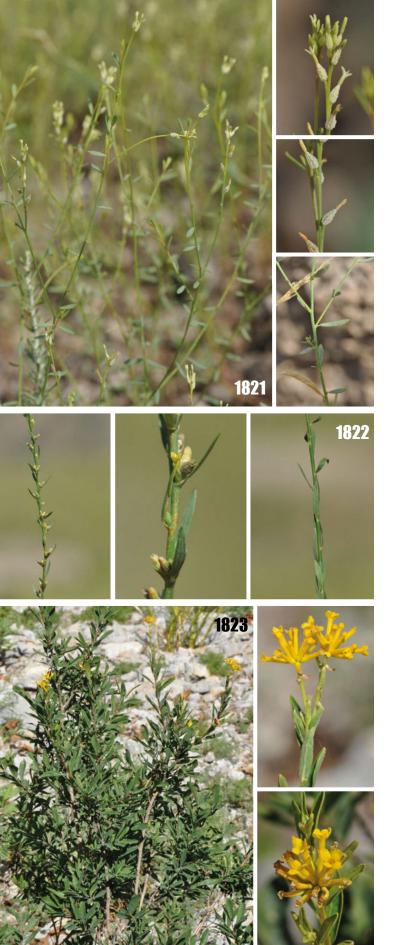
Remarks: Therophyte; plant 7–45 cm high; stem usually single, densely branched from above base; leaves alternate; pedicel very short, 0.5–1 mm, articulate at apex; calyx white; tube cylindric, 3–3.5 mm, slender, lower part

conspicuously ribbed; lobes 4, apex obtuse.









1821. Diarthron vesiculosum (Fisch. & C.A. Mey.) C.A. Mey. var. undulatum M. Nobis, A. Nobis, A. Nowak & S. Nowak



Phytogeographical element: I-T, E-S, M Habitat: River beds, fields, steppes Elevational range: 400 - 2600 Flowering period: V - VIII

Remarks: Therophyte; this new taxon is similar to *Diarthron vesiculosum* var. *vesiculosum*, but it differs by the shape of the ribs on calyx: undulate with U-shaped curves vs. straight respectively.

1822. Thymelaea passerina (L.) Coss. & Germ.

Synonyms: Ligia passerina (L.) Fass.



Phytogeographical element: I-T Habitat: River beds, fields, steppes Elevational range: 400 - 2000 Flowering period: VII - VIII

Remarks: Therophyte; plant 15–80 cm high; leaves alternate, crowded when young; petiole short or absent; calyx tube persistent, yellow to yellow-green, cylindric, contracted at apex of ovary; lobes 4; petaloid appendages absent; stamens twice as many as calyx lobes.

1823. Wikstroemia alberti (Regel) Domke

Synonyms: Restella alberti (Regel) Pobed., Stellera alberti Regel



Phytogeographical element: SE, I-T

Habitat: Juniper forests, broad-leaved forests, forbs

Elevational range: 1000 - 2900 Flowering period: V - VI

Remarks: Nanophanerophyte; shrub 2–2.5 m high; leaves 1.5–3.5 cm long; inflorescesnce with 7–12 flowers, flowers

yellow, tube 7–10 mm, lobes 2–3 mm.

Usefulness: Med, Orn.

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1824. Sparganium stoloniferum (Buch.-Ham. ex Graebn.) Buch.-Ham. ex Juz.

Synonyms: Sparganium asiaticum Graebn., S. carinatum Falc.



Phytogeographical element: I-T, E-S, Orient

Habitat: River beds, rice fields Elevational range: 400 - 850 Flowering period: V - VII

Remarks: Cryptophyte; plant 70–120 cm high or more; leaves (20-)40-90 cm \times 7–16 mm, upper flattened, lower keeled or trigonous on abaxial side; panicles (8–) 20–60 cm, with 3–7 lateral branches, each with (1 or)

7-11 male heads and 1 or 2 female heads.

1825. Typha angustifolia L.



Phytogeographical element: Plurireg

Habitat: Littoral vegetation Elevational range: 400 - 1350 Flowering period: V - VII

Remarks: Cryptophyte; plant 120–250 cm high; leaves 4–9 mm in wide, staminate spikes distinctly separated from pistillate by to 2–4.5 cm of naked axis; staminate spikelets brown; stigmas ca. as broad as styles.

1826. Typha domingensis Pers.

Synonyms: Typha angustata Bory & Chaub.



Phytogeographical element: Plurireg Habitat: Riverside forests, littoral vegetation

Elevational range: 350 - 850 Flowering period: VI - VII

Remarks: Cryptophyte; plant 150–300 cm high; leaves 4–9 mm width, staminate spikes distinctly separated from pistillate by to 2–6 cm of naked axis; staminate spikelets light-brown; stigmas linear to lanceolate, 0.8–1.5 mm, broader than styles; hairs on stalk shorter than style.









1827. Typha latifolia L.



Phytogeographical element: Plurireg Habitat: Rice fields, littoral vegetation

Elevational range: 350 - 850 Flowering period: VI - VII

Remarks: Cryptophyte; plant 100–200 cm high; leaves glaucous; inflorescences: staminate spikes contiguous with pistillate or sometimes separated by to 0.5 cm of naked axis; staminate spikelets dark brown, about as long as pistillate.

1828. Typha laxmannii Lepech.



Phytogeographical element: Plurireg Habitat: Rice fields, littoral vegetation Elevational range: 450 - 1900

Flowering period: VI - VII

Remarks: Cryptophyte: plant

Remarks: Cryptophyte; plant 60–130 cm high; leaves 2–4(–6) mm width, staminate spikes distinctly separated from pistillate by to 2–4.5 cm of naked axis; staminate

spikelets light brown.

1829. Typha minima Funck



Phytogeographical element: I-T, M, Orient Habitat: River beds, riverside forests

Elevational range: 550 - 1600 Flowering period: VII - VIII

Remarks: Cryptophyte; plant up to 1 m tall; leaves 1–3 mm wide; male part of spikes 3–8 cm.

1830. Ulmus pumila L.



Phytogeographical element: A, I-T Habitat: Riverside forests Elevational range: 500 - 1400 Flowering period: III - IV

Remarks: megaphanerophyte; plant up to 25 m high; leaf blade margin simply serrate or sparsely doubly serrate; leaf base blade symmetric to +/- oblique; samaras weakly

asymmetric; seed at center of samara.

Usefulness: Hou.

1831. Parietaria judaica L.

Synonyms: Parietaria jaxartica N. Pavl.



Phytogeographical element: I-T, M

Habitat: Rocks

Elevational range: 700 - 3500 Flowering period: V - VIII

Remarks: Cryptophyte; plant 10-30(-50) cm high, woody

at base; clusters composed of bisexual flowers.

1832. Parietaria lusitanica L. subsp. serbica (Pančić) P.W. Ball

Synonyms: Parietaria serbica Pančić



Phytogeographical element: I-T, M Habitat: Rocks, loose sandy screes, screes

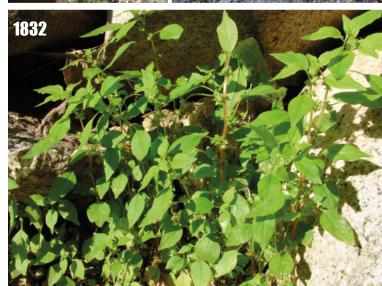
Elevational range: 800 - 1800 Flowering period: V - VI

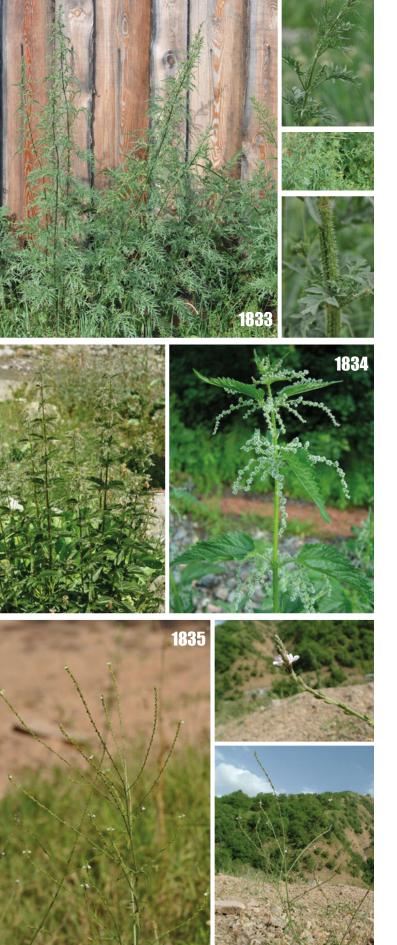
Remarks: Therophyte; plant up to 30 cm high; clusters composed of bisexual and female flowers, bracts oblong-

lanceolate.









1833. Urtica cannabina L.



Phytogeographical element: I-T, E-S Habitat: Ruderal, steppes, xeric shrubs

Elevational range: 800 - 2600 Flowering period: VII - IX

Remarks: Cryptophyte; plant up to 1.5 m, monoecious; leaf 3–5-palmatisect or -palmatipartite, with pinnatisect lobes; female inflorescences in fruit erect or spreadingt;

achene verrucose.

1834. Urtica dioica L.



Phytogeographical element: Plurireg

Habitat: Pastures, ruderal Elevational range: 400 - 2800 Flowering period: V - VII

Remarks: Cryptophyte; plant up to 1m high usually dioecious; leaf blade ovate, lanceolate, apex acuminate or long acuminate; female inflorescences often drooping in

fruit; achene smooth. Usefulness: Med, For, Ind.

1835. Verbena officinalis L.



Phytogeographical element: I-T, M, E-S

Habitat: Riverside forests, pastures, fields, forbs

Elevational range: 600 - 2300 Flowering period: V - VII

Remarks: Cryptophyte; plant 25–100 cm tall, somewhat woody at base, branched above; leaves oblong to oblong-lanceolate, 3–8 cm long, 1–3.5 cm broad, deeply serrate; calyx tube longer than bracts, minutely 5-toothed, ribbed, hairy; corolla–tube almost cylindrical, ca. 6 mm long, unequally 5-lobed, hairy.

Usefulness: Foo.

1836. Viola alaica Vved.

Synonyms: Viola oxycentra Juz., V. turkestanica Regel & Schmalh., V. turkestanica var. rupestris Juz.,



Phytogeographical element: E, I-T

Habitat: Alpine meadows, rocks, xeric shrubs

Elevational range: 2000 - 2800 Flowering period: V - VII

Remarks: Cryptophyte; plant up to 12 cm high, glabrous;

leaves ovate or oblong-ovate, cuneate at base; sepals elliptical, capsule 6–9 mm long, ovate.

1837. Viola altaica Ker-Gawl.



Phytogeographical element: EI-T, E-S

Habitat: Alpine meadows Elevational range: 200 - 3300 Flowering period: VII - VIII

Remarks: Cryptophyte; plant up to 15 cm high; stipule pinnatifid; leaf blade orbicular-ovate or oblong-ovate; flowers 2–4.5 cm in diameter; sepals oblong-lanceolate, apex +/- acute; capsule 0.9–1.2 cm long; occurrs also in

yellow form (phot. 1833b).

1838. Viola majchurensis Pissjauk.



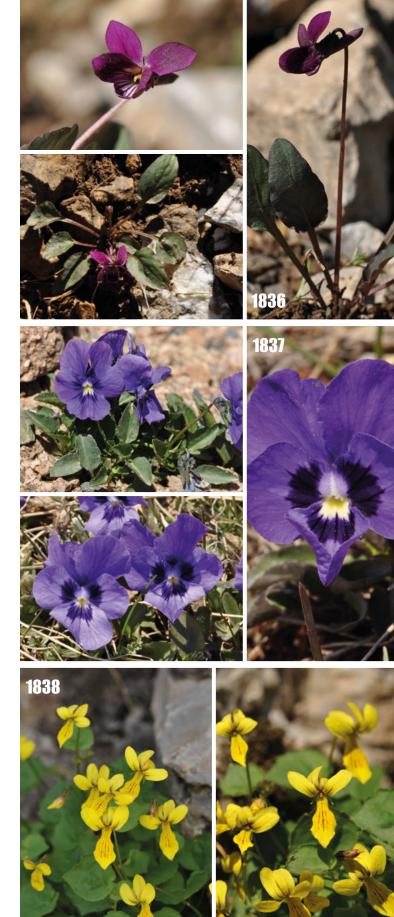
Phytogeographical element: E, I-T

Habitat: Rocks

Elevational range: 2200 - 2800 Flowering period: VI - VIII

Remarks: Cryptophyte; plant 6–20 cm high; stems numerous; petioles 1–13 cm long; leaves broadly cordate, serrulate; petals glabrous; capsule 3–4.5 cm long,

pubescent.













1839. Viola occulta Lehm.



Phytogeographical element: I-T

Habitat: River beds, juniper forests, ruderal, steppes, xeric

shrubs

Elevational range: 700 - 2700 Flowering period: III - VI

Remarks: Therophyte; plant up to 20 cm high; upper stem leaves lanceolate or linear-lanceolate; sepals with papillose margin; petals as long as sepals; capsule 5–8 mm long,

ovate, glabrous.

1840. Viola rupestris F.W. Schmidt



Phytogeographical element: Plurireg

Habitat: Coniferous forests, alpine swards, alpine steppes

Elevational range: 1200 - 3600 Flowering period: VII - VIII

Remarks: Cryptophyte; plant 5–10 cm high; leaf blade orbicular or ovate-orbicular, base shallowly cordate, margin regularly crenate, apex obtuse; sepals lanceolate; capsule oblong, 5–7 mm long, puberulous or glabrous.

1841. Viola tianschanica Maxim.



Phytogeographical element: EI-T

Habitat: Alpine meadows, fens and mires

Elevational range: 3700 - 4500 Flowering period: VII - VIII

Remarks: Cryptophyte; plant up to 5 cm high, glabrous; leaves 1–2 cm long, apex obtuse, margin entire or slightly crenate; spur 1–1.5 mm long; capsule 4–5 mm long, ovate.

1842. Viola tricolor L.



Phytogeographical element: A, Plurireg

Habitat: Ruderal

Elevational range: 800 - 900 Flowering period: V - VIII

Remarks: Therophyte; plant 10–40 cm high; blade of stem leaves ovate, oblong-orbicular, oblong-lanceolate, base rounded, margin crenate, apex rounded or obtuse; sepals oblong-lanceolate, margin narrowly membranous, apex acute; capsule ellipsoid, 8–12 mm long, glabrous.

1843. Ampelopsis vitifolia (Boiss.) Planch.

Synonyms: Vitis vitifolia Boiss.



Phytogeographical element: I-T Habitat: River beds, screes Elevational range: 800 - 1800

Flowering period: V

Remarks: Nanophanerophyte; plant up to 1.5 m, climbing; whole plant glabrous; leaves broadly ovate, deltoid or cordate, obscurely 3-lobed, truncate cuneate at base annual twigs; calyx minute ca. 1.5 mm across and ca. 0.5 mm long; petals 5, distinct, not cohering hooded at apex ca. 2 mm long, more or less triangular.

Usefulness: Orn.

















1844. Eremurus albertii Regel



Phytogeographical element: I-T Habitat: Screes, thermophilous shrubs Elevational range: 1100 - 1200

Flowering period: IV

Remarks: Cryptophyte; plant 50-100 cm high; leaves 1–2 cm wide, glabrous; raceme laxly many flowered; tepals 1-nerved, tip not incurved nor involute, segments pink; stamens not longer than perianth.

Usefulness: Orn.

1845. Eremurus bucharicus Regel



Phytogeographical element: E, I-T

Habitat: Pseudosteppes, thermophilous shrubs

Elevational range: 600 - 1600 Flowering period: V-VI

Remarks: Cryptophyte; plant 60-100 cm high; leaves ca. 0.5 cm wide, glabrous; raceme laxly many flowered; tepals 1-nerved, tip not incurved nor involute, segments white

or pale rose; fruit 1.5-1.8 cm across.

Usefulness: Orn.

1846. Eremurus comosus O. Fedtsch.



Phytogeographical element: E, I-T Habitat: xeric shrubs, forbs Elevational range: 800 - 2000 Flowering period: V - VII

Remarks: Cryptophyte; plant 70–120 cm high; leaves 1–3 cm wide, pubescent; raceme densely many flowered; tepals pink to light brown, 3-veined, after blooming only

slightly incurved and involute.

Usefulness: Orn.

1847. Eremurus fuscus (O. Fedtsch.) Vved.



Phytogeographical element: I-T Habitat: Rocks, screes, xeric shrubs Elevational range: 2000 - 3000 Flowering period: VI - VII

Remarks: Cryptophyte; plant 70–150 cm high; leaves 1–3 cm wide, glabrous; raceme densely many flowered; tepals 3-veined, after blooming incurved and involute; ovary and capsule smooth; pedicels spreading outside. Usefulness: Orn.

1848. Eremurus kaufmannii Regel

Synonyms: Eremurus griffithii Baker



Phytogeographical element: I-T Habitat: Meadows, alpine swards, forbs Elevational range: 1600 - 3000

Flowering period: VI - VII

Remarks: Cryptophyte; plant 70–100(–150) cm high; leaves 15–35 mm wide, pubescent; raceme densely many flowered; tepals 1-nerved, tip not incurved nor involute, segments white; stamens not longer than perianth.

Usefulness: Orn.

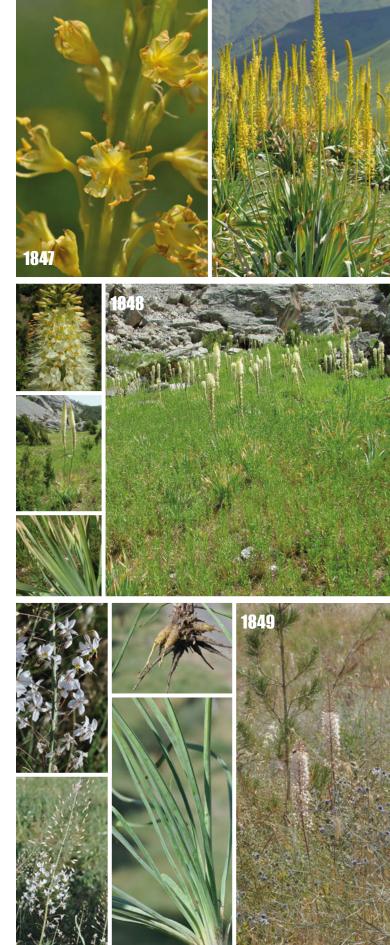
1849. Eremurus olgae Regel

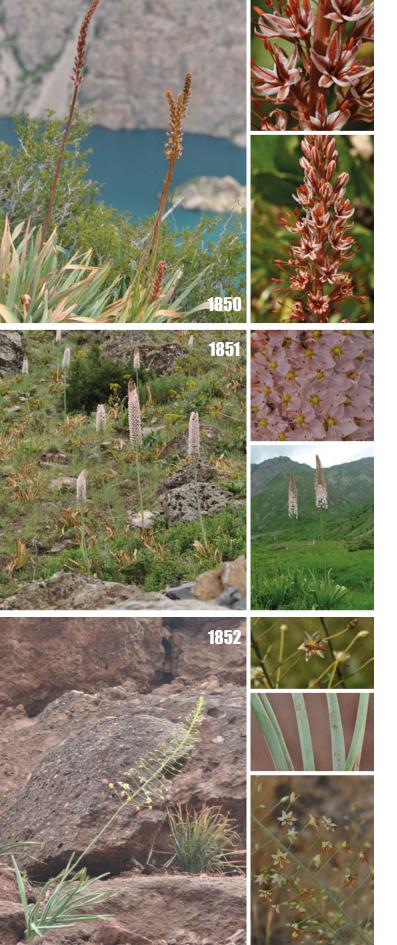


Phytogeographical element: E, I-T Habitat: Loose sandy screes, screes Elevational range: 700 - 2700 Flowering period: V - VII

Remarks: Cryptophyte; plant 70–100 cm high; leaves 5–10 mm wide, keeled, glabrous, scabrous at margins; raceme densely many flowered; bracts glabrous; tepals 1-nerved, tip not incurved nor involute, segments white–pink; stamens not longer than perianth.

Usefulness: Med, Foo, Orn.





1850. Eremurus regeli Vved.



Phytogeographical element: E, I-T

Habitat: Rocks, screes Elevational range: 1000 - 3000 Flowering period: VI - VII

Remarks: Cryptophyte; plant 80–150 cm high; leaves 2.5–5 cm wide, keeled, glabrous, ciliate at margins; raceme densely many flowered; tepals pink with dark pink to light brown middle vein, after blooming incurved and involute; ovary and capsule wrinkled.

Usefulness: Orn.

1851. Eremurus robustus (Regel) Regel

Synonyms: Henningia robusta Regel



Phytogeographical element: I-T Habitat: Pastures, forbs Elevational range: 1600 - 3100 Flowering period: VI - VII

Remarks: Cryptophyte; plant 120–200 cm high; leaves 5–8 cm wide, keeled, glabrous; raceme densely many flowered; tepals 1-nerved, tip not incurved nor involute, segments light-pink; stamens not longer than perianth.

Usefulness: Foo, Orn.

1852. Eremurus sogdianus (Regel) Benth. & Hook. f.

Synonyms: Selonia sogdiana Regel



Phytogeographical element: I-T Habitat: Rocks, screes, xeric shrubs Elevational range: 950 - 2600 Flowering period: V - VI

Remarks: Cryptophyte; plant 50–80 (–150) cm high; leaves 4–10 mm wide, keeled, glabrous, ciliate at margins; raceme laxly many flowered; tepals 3-veined, with green strip in the middle, after blooming incurved and involute; outer perianths oblong-lanceolate, 2 times narrower than inner.

Usefulness: Med, Orn.

726 Xanthorrhoeaceae

1853. Eremurus stenophyllus (Boiss. & Buhse) Baker

Synonyms: Ammolirion stenophyllum Boiss. & Buhse, Eremurus aurantiacus Baker, E. bungei Baker



Phytogeographical element: I-T Habitat: Rocks, screes, xeric shrubs Elevational range: 1600 - 3000 Flowering period: VI - VII

Remarks: Cryptophyte; plant 50–100(–150) cm high; leaves 4–10 mm wide, keeled, glabrous; raceme densely many flowered; tepals 1-nerved, tip not incurved nor involute, segments yellow to brown-yellow; stamens 2

times longer than perianth.

Usefulness: Orn.

1854. Eremurus suworowii Regel

Synonyms: Eremurus bucharicus O. Fedtsch., E. parviflorus Regel

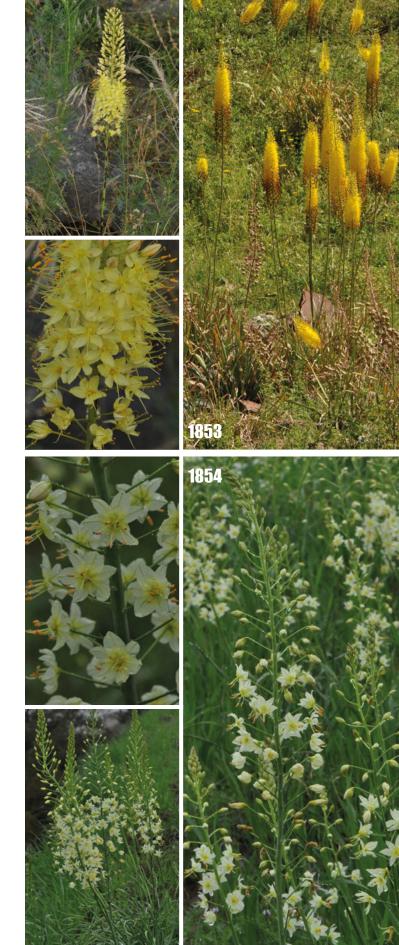


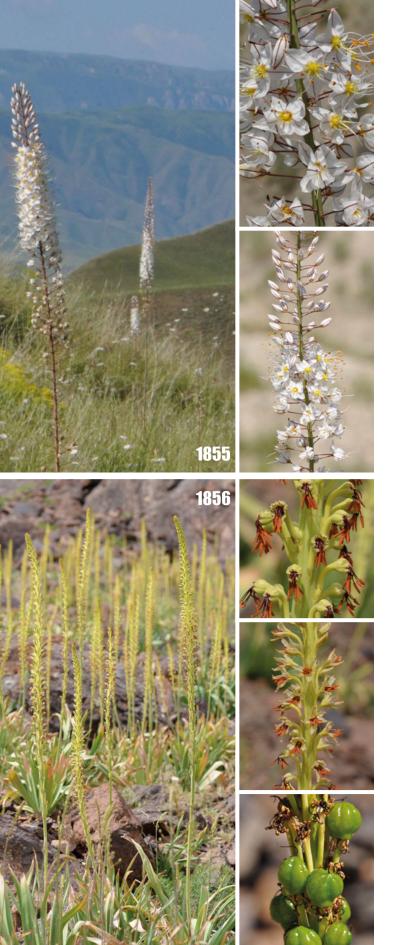
Phytogeographical element: E, I-T Habitat: Meadows, steppes, forbs Elevational range: 800 - 1900 Flowering period: V - VI

Remarks: Cryptophyte; plant 50–100 cm high; leaves 3–8 mm wide, keeled, glabrous, scabrous at margins; raceme laxly many flowered; tepals 1-nerved, tip not incurved nor involute, segments white-yellow; stamens

not longer than perianth.

Usefulness: Orn.





1855. Eremurus tianschanicus Pazij & Vved. ex Pavlov



Phytogeographical element: I-T

Habitat: Loose sandy screes, screes, steppes

Elevational range: 900 - 2000 Flowering period: VI - VII

Remarks: Cryptophyte; plant 60–100 cm high; leaves 5–10 mm wide, keeled, glabrous, scabrous at margins; raceme densely many flowered; bracts ciliate; tepals 1-nerved, tip not incurved nor involute, segments white–pink; stamens somewhat longer than perianth.

Usefulness: Orn.

1856. Eremurus turkestanicus Regel



Phytogeographical element: SE, I-T

Habitat: Loose sandy screes, pastures, screes

Elevational range: 1100 - 1800 Flowering period: V - VI

Remarks: Cryptophyte; plant 70–100 cm high; leaves 2–4.5 cm wide, glabrous; raceme densely many flowered; tepals 3-veined, after blooming incurved and involute; ovary and capsule smooth; pedicels adjacent to stem.

Usefulness: Foo, Orn.

1857. Tribulus terrestris L.



Phytogeographical element: I-T, M, E-S, S-S Habitat: River beds, semi-deserts, ruderal, fields

Elevational range: 500 - 2700 Flowering period: V - VIII

Remarks: Therophyte; plant prostrate, 10–80 cm; leaves paripinnate, 2.5–5 cm long; stipules lanceolate to falcate, 3–5 mm long; flowers yellow, 1–1.5 cm in diameter; fruit up to c. 1 cm in diameter, 4–8 mm long, mericarps densely crested and tuberculate on dorsal side, densely hairy to glabrescent, with 2 long patent and 2 short downwardly directed spines.

1858. Zygophyllum atriplicoides Fisch. & C.A. Mey.

Synonyms: Halimiphyllum atriplicoides (Fisch. & C.A. Mey.) Boriss., Halimiphyllum megacarpum Boriss. Zygophyllum megacarpum Boriss.



Phytogeographical element: I-T

Habitat: Screes, salt shrubs, thermophilous shrubs

Elevational range: 1000 - 2300 Flowering period: IV - V

Remarks: Nanophanerophyte; shrub up to 2.5 m high; leaves simple, $2-4 \times 1.3-1.8$ cm, young with stellate trichomes; pedicel short, curved, 6-7 mm; flower

pentamerous; capsule with 5 wide wings.

Usefulness: For.







1859. Zygophyllum ferganense (Drobow) Boriss.

Synonyms: Zygophyllum xanthoxylon (Bunge) Maxim. var. ferganense Drobow



Phytogeographical element: I-T

Habitat: Salt shrubs, salt marshes, steppes

Elevational range: 700 - 1100 Flowering period: IV - V

Remarks: Nanophanerophyte; shrub 50-80 cm high; petiole flattened, leaves compound with 1 pair of leaflets, usually glabrous, less often pubescent; flower yellow, tetramerous; capsule 2-3 cm with 3 wide wings.

1860. Zygophyllum gontscharovii Boriss

Synonyms: Halimiphyllum gontscharovii (Boriss.) Boriss., Zygophyllum eurypterum Boiss. & Buhse subsp. gontscharovii (Boriss.) Hadidi



Phytogeographical element: E, I-T

Habitat: Salt shrubs, thermophilous shrubs

Elevational range: 350 - 1000 Flowering period: II - IV

Remarks: Nanophanerophyte; shrub up to 0.7-2 m high; leaves simple, $13-15(-25) \times 10-15$ (-18) mm, young with stellate trichomes; flower tetramerous; capsule $15-40 \times 20-40$ mm with 4 wide wings.

Usefulness: For.

1861. Zygophyllum miniatum Cham.



Phytogeographical element: I-T Habitat: Semi-deserts, steppes Elevational range: 1250 - 1650 Flowering period: IV - V

Remarks: Cryptophyte; plant up to 10-25 cm high; plant without caudex; leaves with 2-3 (-4) pairs of leaflets; leaflets ovoid, $10-12 \times 8-10$ mm; flower pentamerous; petals present; capsule 3.5-4 × 0.4-0.5 cm, oblong, linear

lanceolate without wings.

1862. Zygophyllum obliquum Popov



Phytogeographical element: EI-T Habitat: Alpine semi-deserts Elevational range: 3600 - 4000

Flowering period: VII

Remarks: Cryptophyte; plant 30–80 cm high; petiole not scabrous; leaves compound with 1 pair of leaflets; pedicel 10–18 mm; stamens shorter than petals; fruit sometimes ridged but not conspicuously winged, more than 2 × as long as wide, dehiscent.

Usefulness: Med.

1863. Zygophyllum oxianum Boriss.

Synonyms: Zygophyllum fabago L. var. oxianum (Boriss.) Kitam.



Phytogeographical element: I-T

Habitat: River beds, semi-deserts, salt shrubs, salt marshes

Elevational range: 300 - 600 Flowering period: IV - VIII

Remarks: Cryptophyte; plant 30–60 cm high; stems erect or ascending; leaves compound with 1 pair of leaflets; leaflets large, 3–5 cm long; stamens longer than the petals; capsule $1-2 \times 0.5$ –0.6 cm, 5-sided, with 5 ribs.

Usefulness: Med.

1864. Zygophyllum rosowii Bunge

Synonyms: Zygophyllum rosovii Bunge



Phytogeographical element: EI-T Habitat: River beds, alpine semi-deserts

Elevational range: 3800 - 4200 Flowering period: VI - VII

Remarks: Cryptophyte; plant 10–20 cm high; leaves with only 2 leaflets; stamens longer than petals; fruit sometimes ridged but not conspicuously winged, more than $2 \times$ as long as wide, dehiscent; capsule apex

acuminate.











NEW COMBINATIONS

Melica jacquemontii Decne. ex Jacquemont var. *canescens* (Regel) M. Nobis & A. Nowak, *comb. nov*.

Basionym: *Melica cupani* Guss. var. *canescens* Regel, Descr. Pl. Nov. Rar. 8: 88. 1880 (and Acta Horti Petrop. 7: 628. 1881).

Trichodesma incanum (Bunge) A. DC. var. glabrescens (Czuk.) M. Nobis & A. Nowak, comb. nov. Basionym: Trichodesma incanum fo. glabrescens Czuk., in A. P. Czukavina, Fl. Tadzhikskoi SSR, 7: 725. 1984.



GLOSSARY OF BOTANICAL TERMS

A

abaxial – surface of an organ facing away from the axis, e.g. lower surface of a leaf

acaulescent – without stem, a plant having no apparent stem

achene – a dry, 1-seeded indehiscent fruit, e.g. in the family Asteraceae or the genus *Ranunculus*

acicular - needle-shaped, narrow, stiff and pointed

actino- – a prefix that indicates a radial pattern, form, or morphology

aculeate - armed with prickles, e.g. stem of a rose

acuminate - tapering gradually to a point

acute – sharply pointed; converging edges making an angle of less than 90°

adaxial – surface of an organ facing towards the axis, e.g. upper surface of a leaf or petal

adnate – fused to an organ of a different kind, e.g. a stamen fused to a petal in the family Amaryllidaceae

alate – having a wing or wings

alien – species introduced to an area outside its natural range

alternate – leaves or flowers borne singly at different levels along a stem

amplexicaul – with a base clasping the stem, usually of a leaf base

androgynous – with male and female flowers in the same plant, synonymous with monoecious

anemophilous - adapted to wind pollination

angiosperm – a flowering plant; a plant with seeds developing within an ovary

anther - the pollen producing part of a stamen

apex - the very tip of an organ

apical - at the apex of an organ

apomorphy – in cladistics, a trait or character that is different from that of the ancestor (i.e. an innovation)

appressed – pressed closely against another organ but not united with it, e.g. hairs on the leaf surface

arachnoid – cobwebby, being covered with fine white hairs

arborescent – tree-like in growth or general appearance

archaeophyte – a non-native plant that has been introduced to an area (outside its natural range) before the end of the 15th century

aristate - with a stiff, bristle-like awn or tip

attenuate - narrowing gradually

auricle – an ear-shaped lobe, particularly a small roundish lateral appendage of a leaf or leaf like organ

auriculate - with auricles

awn – long, bristle-like appendage, generally straight, e.g. stiff pappus element, varying from stiffly bristle-like to hard and needle-like

axis - the main stem of a whole plant or inflorescence

В

beak – a prominent pointed terminal projection, especially of a carpel or fruit

biternate – twice ternate, the three pinnae each divided into three pinnules

bract – a modified leaf associated with a flower or inflorescence, differing in shape, size or colour from other leaves

bracteole – a supplementary or secondary bract on the pedicel of a flower

bulbil – a small bulb or tuber formed in the axil of a leaf or replacing flowers in an inflorescence, and functioning to propagate the plant vegetative

C

calyx tube – a tube formed from the fusion of the sepals
 cambium – a tissue layer that provides partially undifferentiated cells for plant growth

campanulate - bell-shaped

canescent – white or greyish due to the presence of numerous short white hairs

carpel – ovule-bearing structure having its margins fused together, or fused with those of other carpels to enclose the ovule(s) in an ovary

caudate - having a narrow tail-like appendage or tip

chasmophyte – a plant adapted to growing in crevices or hollows, e.g. in cliff faces

community – an assemblage of species that occur together due to similar habitat requirements

cone – a fruit, usually woody, ovoid to globular, including scales, bracts or bracteoles, arranged with other cones around a central axis, e.g. in gymnosperms, especially conifers

connate – fused to another organ of the same kind, e.g. petals connate

cordate – having two equal more or less rounded lobes at base

corymb – flat-topped or slightly vaulted inflorescence in which the lower flowers have longer pedicels than those of the flowers above

cryptogam – plant or plant like organism reproducing by spores and not producing flowers or seed (fern, moss, algae, or fungus) **culm** – the stem in the families: Poaceae, Cyperaceae and Juncaceae

cuneate – wedge-shaped, with straight converging sides, e.g. leaf base cuneate

cyathium – inflorescence consisting of a small cuplike structure enclosing a female flower and several male flowers, typical for the genus *Euphorbia*

cyme – inflorescence, or part of an inflorescence, in which each flower terminates a growing axis, and where further flowers are formed on branches arising below it

D

deciduous – falling seasonally, not persistent, e.g. bark, leaves, or petals

decumbent - reclining on the ground but with the tip
turning up

dentate - toothed, e.g. leaf margin

diaspore – plant dispersal unit, usually consisting of a seed or spore together with any additional tissues that assist dispersal

dioecious – having male and female reproductive structures which develop on different individuals and never on the same individual

disk (disc) – round, flattened, central part of the inflorescence in the family Asteraceae bearing usually numerous flowers

dorsal – relating to or on the surface of an organ or part facing away from the axis

E

emarginate – with a broad, shallow notch in a truncate apex

endemic – having natural distribution restricted to a particular geographic region

entire – having smooth margin, not toothed or dissectedephemeral – short-lived

erect - upright, directed upwards

F

fasciculate - clustered, or appearing in bundles

filament - the stalk of a stamen

filiform - threadlike, slender and elongated

fimbriate - fringed

fissure – a split or crack, often referring to fissured bark; a line or opening of dehiscence

flora – all the plant species growing in a certain region or country

floral tube – an imprecise term sometimes used as a synonym of hypanthium or of corolla tube or of calyx tube

forb – herbaceous flowering plant that is not a graminoid (grass, sedge, or rush)

fruticose – shrubby, having the branching character of a shrub

G

glabrous – having a surface without hairs or projections

gland – a secretory structure within or on the surface of a plant

glandular hair - a hair tipped with a gland

glumes – one of the paired bracts at the base of spikelet in the family Poaceae

glutinous - covered by a sticky substance

gymnosperm – a seed-bearing plant with ovules, and hence seeds, developing on the surface of a leaf

H

halophyte – a plant adapted to living in highly saline habitats

hastate – spear-shaped, e.g. leaf base with two basal lobes directed outwards

herbaceous – not woody; usually green and soft in texture

herbarium – a collection of preserved, usually pressed and dried, plant material used for identification and comparison; also a building in which such collection is stored

hirsute – bearing coarse, rough, long hairs

hispid – bearing long, erect, rigid hairs or bristles, harsh to touch

hypanthium – a tube or cup-like structure in a flower that includes the bases of sepals, petals, and stamens, and may or may not be connected to the ovary

Ι

incurved – bent or curved inwards, e.g. of leaf margin incurved (when curved towards the adaxial side)

inflorescence – a group of flowers with their branches, bracts and bracteoles

insectivorous – having specialized leaves or leaf parts capable of trapping and digesting insects

internode – the portion of a stem between two successive leaves or leaf pairs, or between flowers of an inflorescence

involucre – calyx-like structure at the base of a capitulum in the family Asteraceae, a whorl of phyllaries subtending a flower cluster

K

keel – a prominent longitudinal ridge like the keel of a boat, e.g. the structure of the corolla formed from the

fusion of the lower edge of the two abaxial anterior petals of flowers in the family Fabaceae

I.

labiate – lipped; a tubular corolla which in its upper end is expanded into one or (usually) two lips

laciniate – slashed into narrow, pointed lobes

lanceolate – lance-shaped, narrow and tapering at both ends

lateral – attached to the side of an organ, e.g. leaf lobes on either side of a leaf axis

leaflets - the ultimate segments of a compound leaf

legume - a fruit type characteristic of the family Fabaceae

lemma – the lower of the two bracts enclosing a flower in the family Poaceae

ligule – strap-shaped structure; membranous appendage on the top of the leaf sheath in the family Poaceae; minute adaxial appendage near the leaf base, e.g. in Selaginella; the flattened part of the corolla in the family Asteraceae

linear – long and narrow, with the parallel sides

lobe – segment of a leaf (or another organ), often rounded and formed by incisions to about halfway to the midrib

lyrate – lyre-shaped; with a large terminal lobe and smaller lateral ones

M

membranous – like a membrane; thin, flexible and trans-

mericarp – one-seeded portion of a fruit that fragments when mature, typical of the families: Geraniaceae, Apiaceae, Boraginaceae, Malvaceae

mesocarp - the middle layer of a fruit wall, often fleshy

N

navicular - boat-shaped

nerve - vein

node – the part of a stem from which leaves or branches arise

nomen conservandum – conserved name, usually a name that became much better known than the correct name, so that a substitution was made

nomen illegitimum – a name that is either superfluous at its time of publication because the taxon to which it was applied already has a name, or the name has already been applied to another plant (a homonym)

nomen invalidum – a name that is not validly published, and technically is therefore not a botanical name

nomen nudum – a name not published in accordance with the International Code of Nomenclature, usually without a diagnosis or description of the entity to which it applies, and without reference to either

nut – a hard, dry, indehiscent fruit containing a single seed
 nutlet – a small nut; synonymous with mericarp; any of the one-seeded portions of a fruit, that fragments when mature, typical of the families: Geraniaceae, Apiaceae, Boraginaceae, Malvaceae

0

obovate – a shape similar to ovate but widest at the distal end and 1.2–3 times as long as wide

obtuse - blunt or rounded at the apex

orbicular – flat and more or less circular in outline

ovary – the basal portion of a carpel or group of fused carpels, enclosing the ovules

ovoid – egg-shaped, with wider portion at base; 3-dimensional object, ovate in all sections through long-axis

P

palea – the upper of two bracts enclosing a flower in the family Poaceae

palmate – of a simple leaf with three or more distinct lobes whose veins meet at the base panicle – a compound raceme; an indeterminate inflorescence in which the flowers are borne on branches of the main axis or on further branches of these

pappus – in daisy florets, a tuft or ring of hairs or scales borne above the ovary and outside the corolla or a tuft of hairs on a fruit

pectinate - pinnately divided with narrow segments
 closely set like the teeth of a comb

pedicel – the stalk of a flower; may also be applied to the stalk of a capitulum in the family Asteraceae

pendulous – hanging, for example an ovule attached to a placenta on the top of the ovary

perianth – the collective term for the calyx and corolla of a flower, generally used when the two are too similar to be easily distinguishable

petal – one of the segments of the inner whorl(s) of the perianth, usually conspicuously coloured

petiole - the stalk of a leaf

phyllary – sepal-like bracts on the outside of the capitulum in the family Asteraceae

pilose - covered with soft, weak, thin hairs

pinnate – about a compound leaf with leaflets arranged on either side of a leaf axis; also used to describe the arrangement of veins within leaf blade

pinnatifid - pinnately lobed

prickle - a hard, pointed outgrowth from the surface of a plant (not containing a vein) procumbent - spreading along the ground but not rooting
 at the nodes

prostrate – lying flat on the ground and commonly rooting at nodes

puberulous (or puberulent) - covered with minute soft erect hairs

pulverulent - having powdery or crumbly particles as if pulverized

pungent - having a sharp, hard point

pyriform - pear-shaped

R

raceme – elongated inflorescence composed of pedicellate flowers maturing from the bottom upwards, with no terminal flower

rachilla – the axis of spikelet located above the glumes, typical of the family Poaceae

rachis - the axis of an inflorescence or a pinnate leaf

radial - pertaining to a radius or ray

ray - anything that radiates outwards

recurved - bent or curved backwards or downwards

reniform - kidney-shaped

reticulate - forming a network, e.g. leaf venation

rhizome – a perennial underground stem, usually growing horizontally, sometimes swollen or thickened

rosette – a cluster of tightly packed leaves circularly spreading in one plane

rudimentary - incompletely developed

rugose - with a wrinkled surface

rupicolous - growing on or among rocks

S

saxicolous - synonymous with rupicolous

scale – a flattened, membranous or sometimes woody structure, usually a reduced leaf; a thin flap of tissue of epidermal origin or a flat

scurf - a loose scaly crust coating a surface

sepal – one of the segments of the outer whorl(s) of the perianth

sessile - stalkless, or with no visible stalk

sheath – a tubular organ, enveloping another organ, e.g. the basal part of leaves, which encloses the stem in the family Poaceae

shoot – a young stem or branch

silicula – a short siliqua, less than three times as long as its width

siliqua – a dry, dehiscent fruit typical of the family Brassicaceae, at least three times as long as its width

sinuate - with deep, rounded incisions, e.g. leaf margin

spathe - a large bract surrounding an inflorescence

spike – an unbranched inflorescence with sessile flowers or spikelets

spikelet – flower cluster typical for the family Poaceae consisting of one to many flowers subtended by two bracts (glumes)

spine – a stiff, sharp structure formed by the modification of a plant organ that contains vascular tissue

spinescent – terminating in a spine, having a spine or spines

spur – a conical or tubular outgrowth of any part of a flower, often containing nectar, e.g. in *Consolida*, *Delphinium*; a short shoot bearing leaves and/or flowers and fruit

squarrose – having a rough surface, caused by the presence of projecting hairs, scales, etc.; having or relating to parts that are recurved, e.g. squarrose bracts

stalk - narrow basal part of an organ

stamen – the male organ of a flower, producing pollen, consisting of a filament and an anther

staminode – a sterile stamen, often rudimentary, sometimes petal-like.

standard - the large posterior petal of pea-flowers

stellate - star-shaped

stigma – apical part of the pistil, that is receptive to pollen

striate - with parallel, longitudinal lines or ridges

strigose - with stiff hairs, which are slanting rather than erect

subglobose – somewhat spherical, but not having the perfect shape of a sphere

subshrub (undershrub) – short woody plant with some herbaceous stems

synonym – a alternate name; a taxonomic name which has the same application as another, especially one which has been superseded and is no longer valid

T

taxon (pl. taxa) – category in a system of biological classification, e.g. species, family

tepal – a segment of a perianth, usually used when all perianth is not differenced in calyx (with sepals) and corolla (with petals)

ternate – arranged in threes, especially (of a compound leaf) having three leaflets

terrestrial – living and growing on land; this is in contrast to living in water (aquatic), on rocks (lithophytic), or on other plants (epiphytic)

thorn – a woody sharp-pointed structure, formed from a modified shoot; synonymous with spine

trichome – variable in size and complexity outgrowth from the epidermis; includes hairs, scales, and non-immersed glands

trullate - trowel-shaped

truncate - ending very abruptly as if cut straight across,
 e.g. leaf tip or base

trunk - main wooden axis (stem) of a tree

tufted – with shoots or leaves clustered together at ground level

tunic - the dry, pappery covering of a bulb or corm

tussock – a dense tuft of plant, usually well separated from neighbouring tussocks, for example in some grasses

U

umbel – an umbrella-shaped inflorescence, with the pedicels arising more or less from a common point

undershrub - short woody plant with some herbaceous
stems

understory – plant life growing beneath the forest canopy

utricle – a small bladder; a bladder-like sac enclosing an ovary or fruit, e.g. in the genus *Carex*

V

vascular – referring to the conducting tissues (xylem and phloem) of vascular plants (pteridophytes and spermatophytes)

vein (also nerve) – a strand of conducting and often strengthening tissue

venation - the arrangement of veins in a leaf

verticillate – whorled, several similar organs at the same point of an axis

villous - covered with long, weak hairs

W

warty – a surface covered with small round protuberances, especially in fruit, leaves, twigs and bark

whorl – an arrangement with more than two organs of the same kind at the same point of an axis, e.g. whorls of branches and reduced leaves in the genus Equisetum, whorls of leaves in the genus Galium

wing – one of the lateral petals in flower typical for the family Fabaceae; a projection running along the stem; a thin appendage to a seed or fruit

woolly – covered with a pubescence of long, soft hairs resembling wool

X

xerophyte – a plant showing adaptation to live in a very dry habitat, tolerating long periods of drought.



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About the Publishers

Polish Academy of Sciences, Botanical Garden Center for Biodiversity Conservation in Powsin

The PAS Botanical Garden – Center for Biological Diversity Conservation was officially founded in 1974 as an independent research unit of the Polish Academy of Sciences.

The Botanical Garden is a research institution dealing with plants in various topics like floristics, taxonomy, physiology, biochemistry, genetics, molecular biology, biotechnology, ecology and horticultural sciences. One of the main objective of the PAS BG is the ex situ conservation of threatened plant diversity of Poland. It is a unique institution bringing together experts from various botanical disciplines for conducting comprehensive and multidisciplinary research on biological phenomena and processes. The main scientific activities of our employees cover issues related to the genetic aspects of plant diversity conservation, which helps to applicate and develop new measures and strategies for maintaining floristic diversity. Traditional collections (of live plants) located in the Garden and cryogenic collections in the Seed Bank run by the unit are a unique source of research samples on a global scale. At the same time, they allow implementation of ex situ protection, like restitution of extinct species in the wild. In addition to scientific surveys, the Garden is deeply involved in the popularization of science, dissemination of botanical knowledge in the society. Geographically, our main study areas are located in Central Europe, Middle Asia and paddy fields across the world. A new direction of research implemented in 2017 is an exploration program of the unique and extremely rich flora of Central Asia, especially in Tajikistan and the Pamir Mountains. Currently, we work on establishing the permanent research station in this region to enhance the studies on ethnobotany, applied botany and conservation botany.

Polish Botanical Society

Founded in 1922, the Polish Botanical Society (PBS) is a membership society whose mission is to promote plant sciences, along with mycology, lichenology, phycology and aerobiology, with the aim of advancing the development of the natural sciences, fostering botanical knowledge as well as combining scientific activities with cultural and economic demands. Since 1923, the society has published peer reviewed journals from all fields of botany. In addition, the PBS is the publisher of the monographic series, which includes extensive dissertations and monographic works, as well as other compact publications. The publisher's profile of interest includes issues related to the latest scientific achievements in the field of broadly defined botanical sciences (such as ecology, evolution, physiology, biotechnology, biodiversity, systematics, development and anatomy of plants, paleobotany, ethnobotany, phytogeography and molecular taxonomy) on all levels of organization of surrounding us nature i.e. from ecosystem to molecules.

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ARKADIUSZ NOWAK born in 1971 in Boleslawiec. He is a professor of botany, vegetation ecologist and environmentalist by education. The most important topics of his research are related to conservation botany, phytosociology, distribution and ecology of vascular plants, studies on distributional patterns of endemic plant species in Middle Asia, restoration ecology, paddy fields vegetation. Currently he is a professor of the PAS Botanical Garden - Center for Biodiversity Conservation in Powsin and at the Opole University. He started the exploration of Middle Asia in 2006 with the main aim to explore the vegetation diversity in this mountainous country. Sylwia is his wife and he has two kids, Pawel (20) and Ania (15).



MARCIN NOBIS born in 1977 in Pionki. He is a professor of the Jagiellonian University in Kraków, taxonomist and ecologist. He is the author of over 230 scientific papers, and the most important topics of his studies are related to taxonomy and phylogeny of vascular plants, phytogeography, conservation botany and vegetation ecology. Currently he is a Head of the Department of Taxonomy, Phytogeography and Paleobotany and Curator of the Herbarium of the Institute of Botany of the Jagiellonian University (KRA). He started the exploration of Central Asian flora and ve-getation in 2007 with the main aims focusing on the taxonomy of vascular plants (mainly Poaceae and Campanulaceae), endemism and conservation of the mountain flora, as well as syntaxonomy of vegetation.

THE PAMIR-ALAI MOUNTAINS are extremely diverse in terms of climate, landscape and habitat conditions. With one of the largest altitudinal amplitudes in the world, long gradients of precipitation and temperatures, different soil substrates and a diverse geology, the Pamir-Alai promotes a great number of plant species and diverse vegetation types. Currently almost 4300 vascular plant species have been reported from the area. Almost 1500 are endemics belonging to 60 families and 188 genera. The Pamir-Alai vegetation is fairly diverse and can be generally divided into 21 types: mesophilous deciduous forests, riverised forests, river-bed forests, xerothermophilous shrubs, subalpine coniferous forests, river-bed shrubs, meadows and pastures, segetal vegetation, alpine meadows and swards, steppes and so-called semi-savannas, xerothermophilous swards, xerothermophilous dwarf shrubs, desert and semi-desert vegetation, fen-spring vegetation, tall-herbs, littoral vegetation, aquatic vegetation, scree and sliding rock vegetation, rock vegetation and salt-marsh vegetation. Our photographic guide includes vivid photographs of 1864 species, as well as their distribution map, systematic position, biological and ecological features. The book is assigned for professional botanists and amateurs, students, plant lovers and tourists visiting Middle Asia or wanting to broadened their knowledge on the extraordinary flora of this region. As the flora of Tajikistan still remains underinvestigated, it is hardly possible to find photographs of the presented species in similar publications or on the web.







